11-6625-3016-20-1

# TM 11-6625-3016-20-1

# ORGANIZATIONAL MAINTENANCE MANUAL

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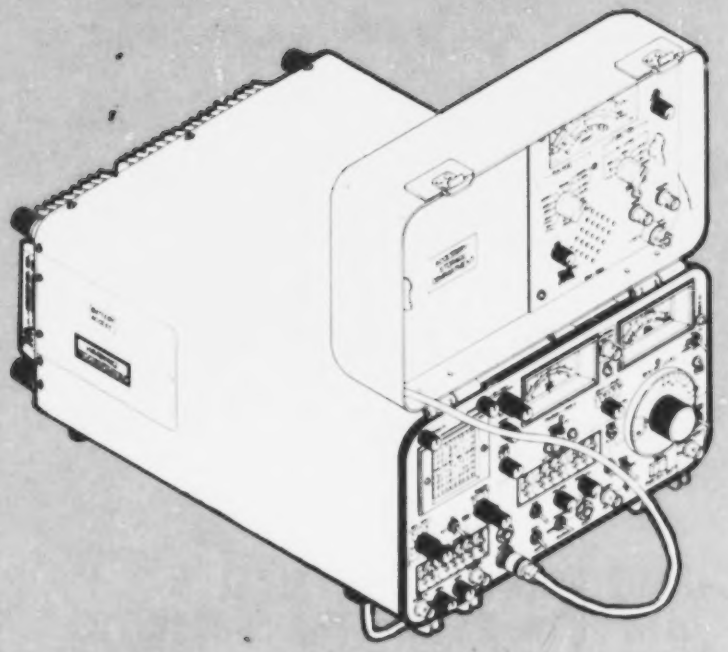

## RADIO TEST SET AN/GRM-114A

**(NSN 6625-01-144-4481)**

HEADQUARTERS, DEPARTMENT OF THE ARMY

**HEADQUARTERS, DEPARTMENT OF THE ARMY**
**20 JUNE 1983**

This copy is a reprint which includes current pages from Change 1.

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## 5 SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

1. DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL

2. IF POSSIBLE, TURN OFF THE ELECTRICAL POWER

3. IF YOU CANNOT TURN OFF ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A WOODEN POLE OR A ROPE OR SOME OTHER INSULATING MATERIAL

4. SEND FOR HELP AS SOON AS POSSIBLE

5. AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION

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No. 1 )

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 5 March 1985

ORGANIZATIONAL MAINTENANCE MANUAL
RADIO TEST SET AN/GRM-114A
(NSN 6625-01-144-4481)

TM 11-6625-3016-20-1, 20 June 1983, is changed as follows:

1. Remove old pages and insert new pages as indicated below. New or changed material is indicated by a vertical bar in the margin of the page.

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| 2-17 and 2-18 | 2-17 and 2-18 |
| 2-23 through 2-28 | 2-23 through 2-28 |
| 2-35 and 2-36 | 2-35 and 2-36 |
| 2-45 and 2-46 | 2-45 and 2-46 |
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2. File this change sheet in front of the publication for reference purposes.

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*The Adjutant General*

DISTRIBUTION:
To be distributed in accordance with DA Form 12-51 literature for AN/VRC-12.

**WARNING**

HIGH VOLTAGE
is used in this equipment
DEATH ON CONTACT
MAY RESULT IF SAFETY PRECAUTIONS
ARE NOT OBSERVED

Maintenance adjustments of this equipment are made with power applied. Be careful when working near the AC power input on rear panel.

DON'T TAKE CHANCES!

DANGEROUS DC VOLTAGES, UP TO 2,000 V, MAY EXIST WITHIN THE AN/GRM-114A WHILE THE UNIT IS OPERATING. AVOID SHOCK HAZARDS.

A hazardous solvent, trichlorotriflouroethane, is used for cleaning this equipment.

ADEQUATE VENTILATION SHOULD BE PROVIDED WHILE USING TRICHLOROTRIFLOUROETHANE. PROLONGED BREATHING OF VAPORS SHOULD BE AVOIDED. THE SOLVENT SHOULD NOT BE USED NEAR HEAT OR OPEN FLAME; THE PRODUCTS OF DECOMPOSITION ARE TOXIC AND IRRITATING. SINCE TRICHLOROTRIFLOUROETHANE DISSOLVES NATURAL OILS, PROLONGED CONTACT WITH SKIN SHOULD BE AVOIDED. WHEN NECESSARY, USE GLOVES WHICH THE SOLVENT CANNOT PENETRATE. IF THE SOLVENT IS TAKEN INTERNALLY, CONSULT A PHYSICIAN IMMEDIATELY.

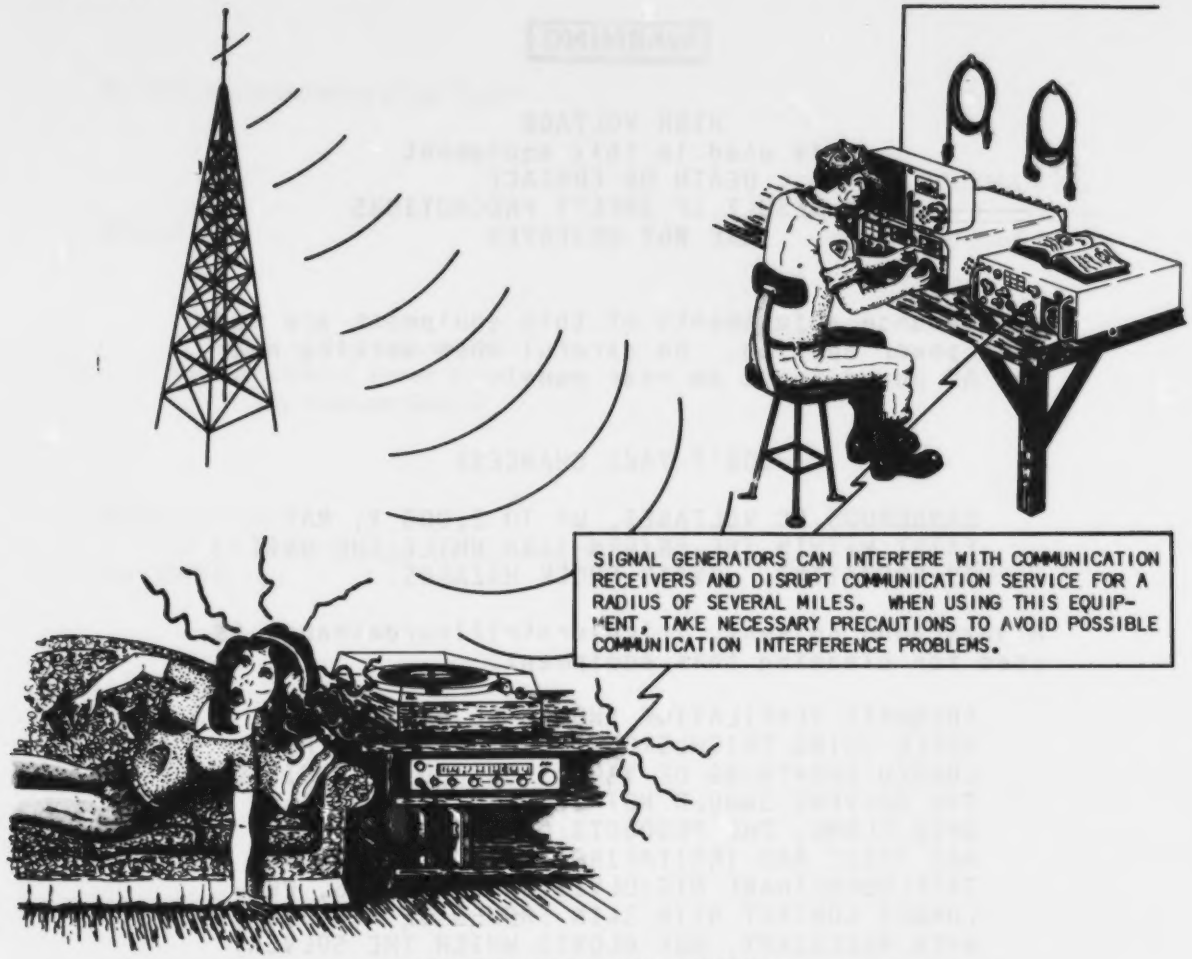
Two people are required to lift and/or carry the AN/GRM-114A.

DO NOT SERVICE OR ADJUST ALONE.

DO NOT ATTEMPT INTERNAL SERVICE OR ADJUSTMENTS UNLESS ANOTHER PERSON, CAPABLE OF RENDERING FIRST AID AND RESUSCITATION IS PRESENT.

OTHER WARNINGS AND CAUTIONS ARE CONTAINED ON THE PAGES THEY APPLY THROUGHOUT THIS MANUAL.

A PERIODIC REVIEW OF SAFETY PRECAUTIONS IN TB 385-4, SAFETY PRECAUTIONS FOR MAINTENANCE OF ELECTRICAL/ELECTRONICS EQUIPMENT, IS RECOMMENDED.



SIGNAL GENERATORS CAN INTERFERE WITH COMMUNICATION RECEIVERS AND DISRUPT COMMUNICATION SERVICE FOR A RADIUS OF SEVERAL MILES. WHEN USING THIS EQUIP-MENT, TAKE NECESSARY PRECAUTIONS TO AVOID POSSIBLE COMMUNICATION INTERFERENCE PROBLEMS.

## HOW TO USE THIS MANUAL

THIS MANUAL TELLS YOU HOW YOU CAN SERVICE AND MAINTAIN YOUR AN/GRM-114A RADIO TEST SET. WHEN YOU FIRST RECEIVE YOUR RADIO TEST SET, READ THIS MANUAL FROM FRONT TO BACK. BECOME FAMILIAR WITH EVERY PART OF THE MANUAL AND THE TEST SET AS YOU PERFORM THE INITIAL SERVICING AND ADJUSTMENTS REQUIRED BEFORE PUTTING YOUR TEST SET IN REGULAR USE.

ALTHOUGH THE CASE OF YOUR TEST SET IS SEALED AND NO MAINTENANCE REQUIRING CASE REMOVAL IS DESIGNATED AT THE ORGANIZATIONAL LEVEL, REGULAR PREVENTIVE MAINTENANCE CHECKS AND SERVICES DESCRIBED HERE WILL ASSURE YOU YOUR TEST SET IS FUNCTIONING PROPERLY AND IS ALWAYS READY FOR USE.

THIS MANUAL HAS AN EDGE INDEX WHICH WILL HELP YOU FIND SPECIFIC INFORMATION QUICKLY. SIMPLY SPREAD THE PAGES ON THE RIGHT EDGE OF THE MANUAL UNTIL YOU CAN SEE THE PRINTED BLOCKS. OPEN THE MANUAL WHERE THE BLOCK ON THE EDGE OF THE PAGE LINES UP WITH YOUR SELECTED TOPIC PRINTED ON THE FRONT COVER INDEX.

IN THIS MANUAL, CONTROLS ARE NOT IDENTIFIED WITH THE SAME NUMBERS AS IN TM 11-6625-3016-10-1, OPERATOR'S MANUAL, RADIO TEST SET AN/GRM-114A.

ECHNICAL MANUAL
o. 11-6625-3016-20-1

Headquarters
Department of the Army
Washington, DC, 20 June 1983

# ORGANIZATIONAL MAINTENANCE MANUAL

# RADIO TEST SET

# AN/GRM-114A

# (NSN 6625-01-144-4481)

**REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

You can help improve this manual. If you find any mistakes, or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to Commander, US Army Communications-Electronic Command and Fort Monmouth, ATTN: AMSEL-ME-MP, Fort Monmouth, New Jersey 07703-5007.

A reply will be furnished direct to you.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# CHAPTER 1

# INTRODUCTION

## Section I, GENERAL INFORMATION

### 1-1. SCOPE

a. This manual describes Radio Test Set AN/GRM-114A and contains information for organizational level support and maintenance.

### 1-2. MAINTENANCE FORMS, RECORDS AND REPORTS.

a. Reports of Maintenance and Unsatisfactory Equipment.

Department of the Army forms and procedures used for equipment maintenance are prescribed in DA Pam 738-750 as contained in Maintenance Management Update.

b. Report of Packaging and Handling Deficiencies.

Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/NAVMATINST 4355.73A/AFR 400-54/MCO 4430.3F.

c. Discrepancy in Shipment Report (DISREP) (SF361).

Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33C/AFR 75-18/MCO P4610.19D/DLAR 4500.15.

### 1-3. DESTRUCTION OF ARMY ELECTRONICS MATERIEL.

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

### 1-4. ADMINISTRATIVE STORAGE.

Administrative storage of equipment issued to and used by Army activities shall be in accordance with TM 740-90-1.

### 1-5. QUALITY ASSURANCE/QUALITY CONTROL (QA/QC).

Refer to TB 43-180, Calibration Requirements for the Maintenance of Army Materiel, and TB 43-180-1, Calibration and Repair Requirements for the Maintenance of Army Materiel, for requirements for periodic certification of the AN/GRM-114A.

## 1-6. OFFICAL NOMENCLATURE, NAMES AND DESIGNATIONS.

The official nomenclature of this equipment is Radio Test Set AN/GRM-114A. This includes the communications service monitor, referred to as FM/AM-1100S, the lid-mounted multimeter, referred to as MM-100E, the canvas carrying case, and accessory items described in TM-11-6625-3016-10-1, Operator's Manual, Radio Test Set AN/GRM-114A.

## 1-7. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR.

If your AN/GRM-114A needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-PA-QP, Fort Monmouth, New Jersey 07703-5007. We'll send you a reply.

# Section II, EQUIPMENT DESCRIPTION AND DATA

## 1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES AND FEATURES.

Refer to TM-11-6625-3016-10-1, Operator's Manual, Radio Test Set AN/GRM-114A, for characteristics, capabilities and features of the AN/GRM-114A.

## 1-9. SAFETY, CARE AND HANDLING.

a. If you receive your AN/GRM-114A packed in a steel-banded carton or crate, wear heavy gloves and eye protecting goggles when removing the steel bands. Do not attempt to carry the container by the steel bands.

b. Two people are required to lift and/or carry the AN/GRM-114A.

# Section III, PRINCIPLES OF OPERATION

## 1-10. FM/AM-1100S OPERATION.

The FM/AM-1100S is a digitally synthesized AM/FM/SSB receiver and signal generator. All components within the unit are solid state, with the exception of several switches and the CRT. The quadruple conversion superheterodyne receiver can receive communication signals from 300 kHz to 999.9999 MHz. The signal generator can produce modulated or unmodulated signals from 1 kHz to 999.9999 MHz.

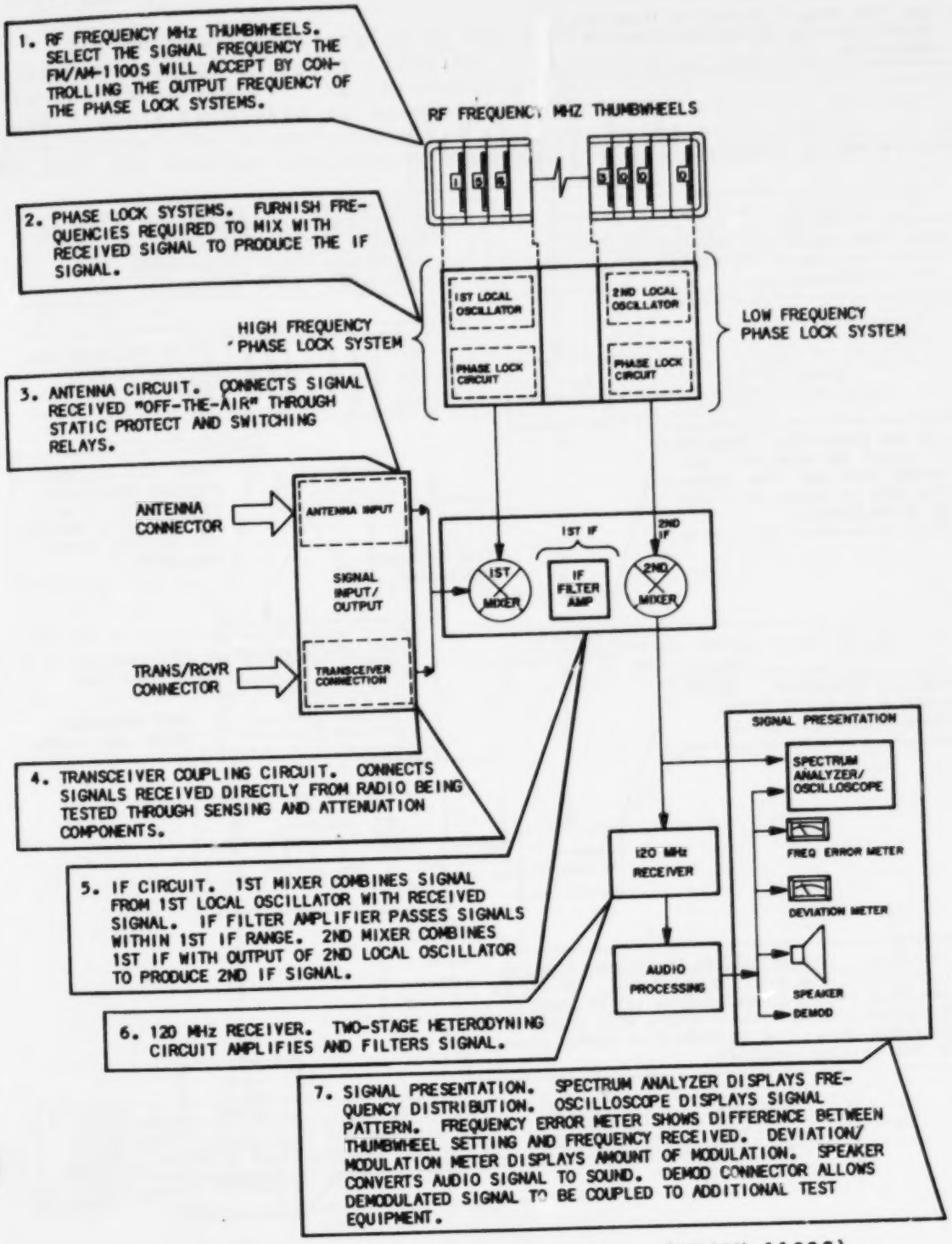

1. RF FREQUENCY MHz THUMBWHEELS. SELECT THE SIGNAL FREQUENCY THE FM/AM-1100S WILL ACCEPT BY CONTROLLING THE OUTPUT FREQUENCY OF THE PHASE LOCK SYSTEMS.
RF FREQUENCY MHZ THUMBWHEELS
2. PHASE LOCK SYSTEMS. FURNISH FREQUENCIES REQUIRED TO MIX WITH RECEIVED SIGNAL TO PRODUCE THE IF SIGNAL.
HIGH FREQUENCY PHASE LOCK SYSTEM
1ST LOCAL OSCILLATOR
PHASE LOCK CIRCUIT
2ND LOCAL OSCILLATOR
PHASE LOCK CIRCUIT
LOW FREQUENCY PHASE LOCK SYSTEM
3. ANTENNA CIRCUIT. CONNECTS SIGNAL RECEIVED "OFF-THE-AIR" THROUGH STATIC PROTECT AND SWITCHING RELAYS.
ANTENNA CONNECTOR
ANTENNA INPUT
SIGNAL INPUT/ OUTPUT
TRANS/RCVR CONNECTOR
TRANSCEIVER CONNECTION
1ST IF
2ND IF
1ST MIXER
IF FILTER AMP
2ND MIXER
4. TRANSCEIVER COUPLING CIRCUIT. CONNECTS SIGNALS RECEIVED DIRECTLY FROM RADIO BEING TESTED THROUGH SENSING AND ATTENUATION COMPONENTS.
5. IF CIRCUIT. 1ST MIXER COMBINES SIGNAL FROM 1ST LOCAL OSCILLATOR WITH RECEIVED SIGNAL. IF FILTER AMPLIFIER PASSES SIGNALS WITHIN 1ST IF RANGE. 2ND MIXER COMBINES 1ST IF WITH OUTPUT OF 2ND LOCAL OSCILLATOR TO PRODUCE 2ND IF SIGNAL.
120 MHz RECEIVER
AUDIO PROCESSING
SIGNAL PRESENTATION
SPECTRUM ANALYZER/ OSCILLOSCOPE
FREQ ERROR METER
DEVIATION METER
SPEAKER
DEMOD
6. 120 MHz RECEIVER. TWO-STAGE HETERODYNING CIRCUIT AMPLIFIES AND FILTERS SIGNAL.
7. SIGNAL PRESENTATION. SPECTRUM ANALYZER DISPLAYS FREQUENCY DISTRIBUTION. OSCILLOSCOPE DISPLAYS SIGNAL PATTERN. FREQUENCY ERROR METER SHOWS DIFFERENCE BETWEEN THUMBWHEEL SETTING AND FREQUENCY RECEIVED. DEVIATION/ MODULATION METER DISPLAYS AMOUNT OF MODULATION. SPEAKER CONVERTS AUDIO SIGNAL TO SOUND. DEMOD CONNECTOR ALLOWS DEMODULATED SIGNAL TO BE COUPLED TO ADDITIONAL TEST EQUIPMENT.

Figure 1-1 Receiver Operation (FM/AM-1100S)

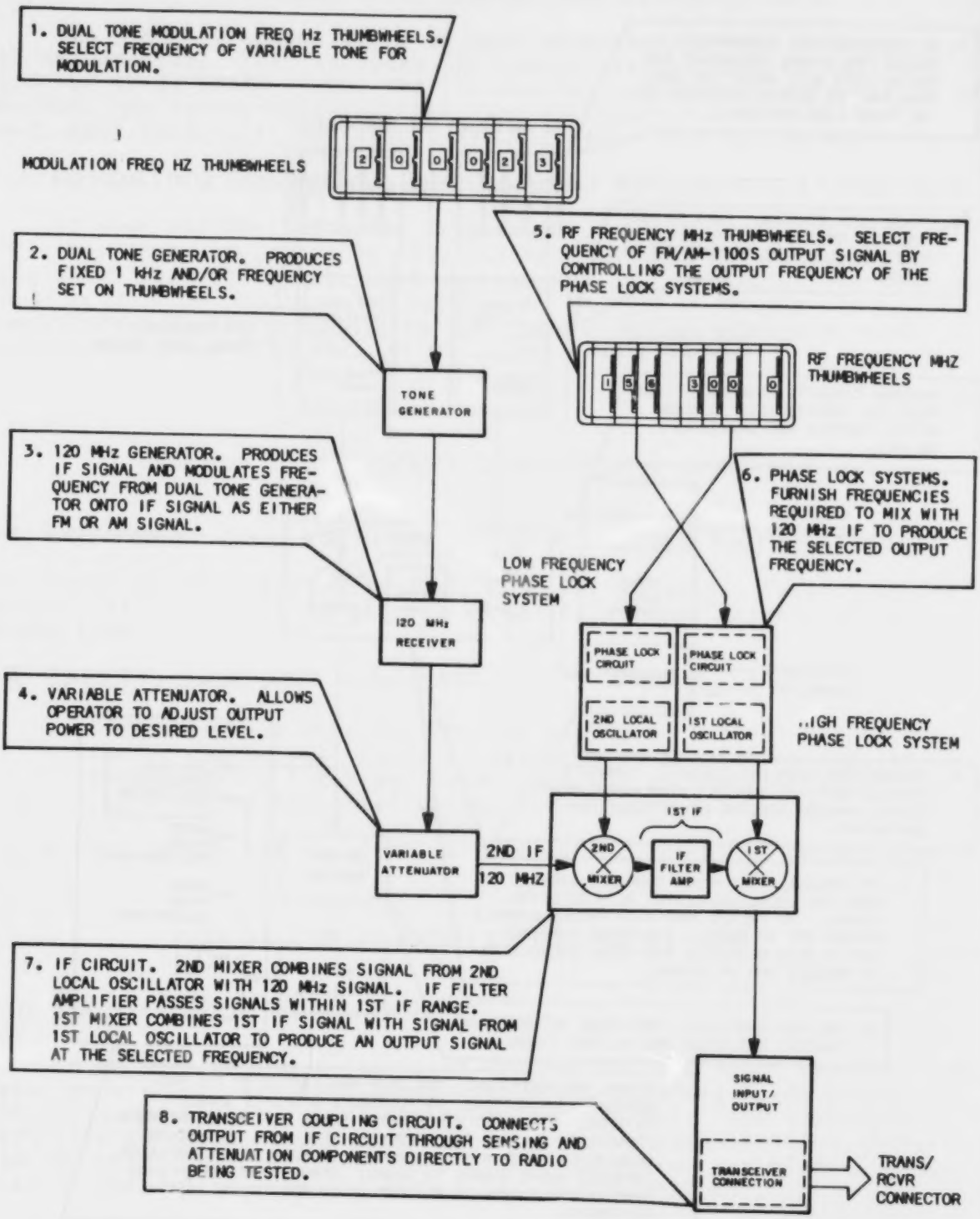

1. DUAL TONE MODULATION FREQ Hz THUMBWHEELS. SELECT FREQUENCY OF VARIABLE TONE FOR MODULATION.
MODULATION FREQ HZ THUMBWHEELS
2 0 0 0 2 3
2. DUAL TONE GENERATOR. PRODUCES FIXED 1 kHz AND/OR FREQUENCY SET ON THUMBWHEELS.
TONE GENERATOR
3. 120 MHz GENERATOR. PRODUCES IF SIGNAL AND MODULATES FREQUENCY FROM DUAL TONE GENERATOR ONTO IF SIGNAL AS EITHER FM OR AM SIGNAL.
120 MHz RECEIVER
4. VARIABLE ATTENUATOR. ALLOWS OPERATOR TO ADJUST OUTPUT POWER TO DESIRED LEVEL.
VARIABLE ATTENUATOR
5. RF FREQUENCY MHz THUMBWHEELS. SELECT FREQUENCY OF FM/AM-1100S OUTPUT SIGNAL BY CONTROLLING THE OUTPUT FREQUENCY OF THE PHASE LOCK SYSTEMS.
1 5 6 3 0 0 0
RF FREQUENCY MHZ THUMBWHEELS
6. PHASE LOCK SYSTEMS. FURNISH FREQUENCIES REQUIRED TO MIX WITH 120 MHz IF TO PRODUCE THE SELECTED OUTPUT FREQUENCY.
LOW FREQUENCY PHASE LOCK SYSTEM
PHASE LOCK CIRCUIT
PHASE LOCK CIRCUIT
2ND LOCAL OSCILLATOR
1ST LOCAL OSCILLATOR
..IGH FREQUENCY PHASE LOCK SYSTEM
1ST IF
2ND MIXER
IF FILTER AMP
1ST MIXER
2ND IF 120 MHZ
7. IF CIRCUIT. 2ND MIXER COMBINES SIGNAL FROM 2ND LOCAL OSCILLATOR WITH 120 MHz SIGNAL. IF FILTER AMPLIFIER PASSES SIGNALS WITHIN 1ST IF RANGE. 1ST MIXER COMBINES 1ST IF SIGNAL WITH SIGNAL FROM 1ST LOCAL OSCILLATOR TO PRODUCE AN OUTPUT SIGNAL AT THE SELECTED FREQUENCY.
8. TRANSCEIVER COUPLING CIRCUIT. CONNECTS OUTPUT FROM IF CIRCUIT THROUGH SENSING AND ATTENUATION COMPONENTS DIRECTLY TO RADIO BEING TESTED.
SIGNAL INPUT/ OUTPUT
TRANSCEIVER CONNECTION
TRANS/ RCVR CONNECTOR

Figure 1-2 Signal Generator Operation (FM/AM-1100S)

## 1-11. MM-100E OPERATION.

The MM-100E is an analog DC milliammeter operated by several different signal analysis circuits. It depends on the FM/AM-1100S for its operating power. The FM/AM-1100S also is the calibrated source of some signals furnished to equipment being tested with the MM-100E. It also demodulates signals received from equipment being tested so the MM-100E can analyze the demodulated audio signals.

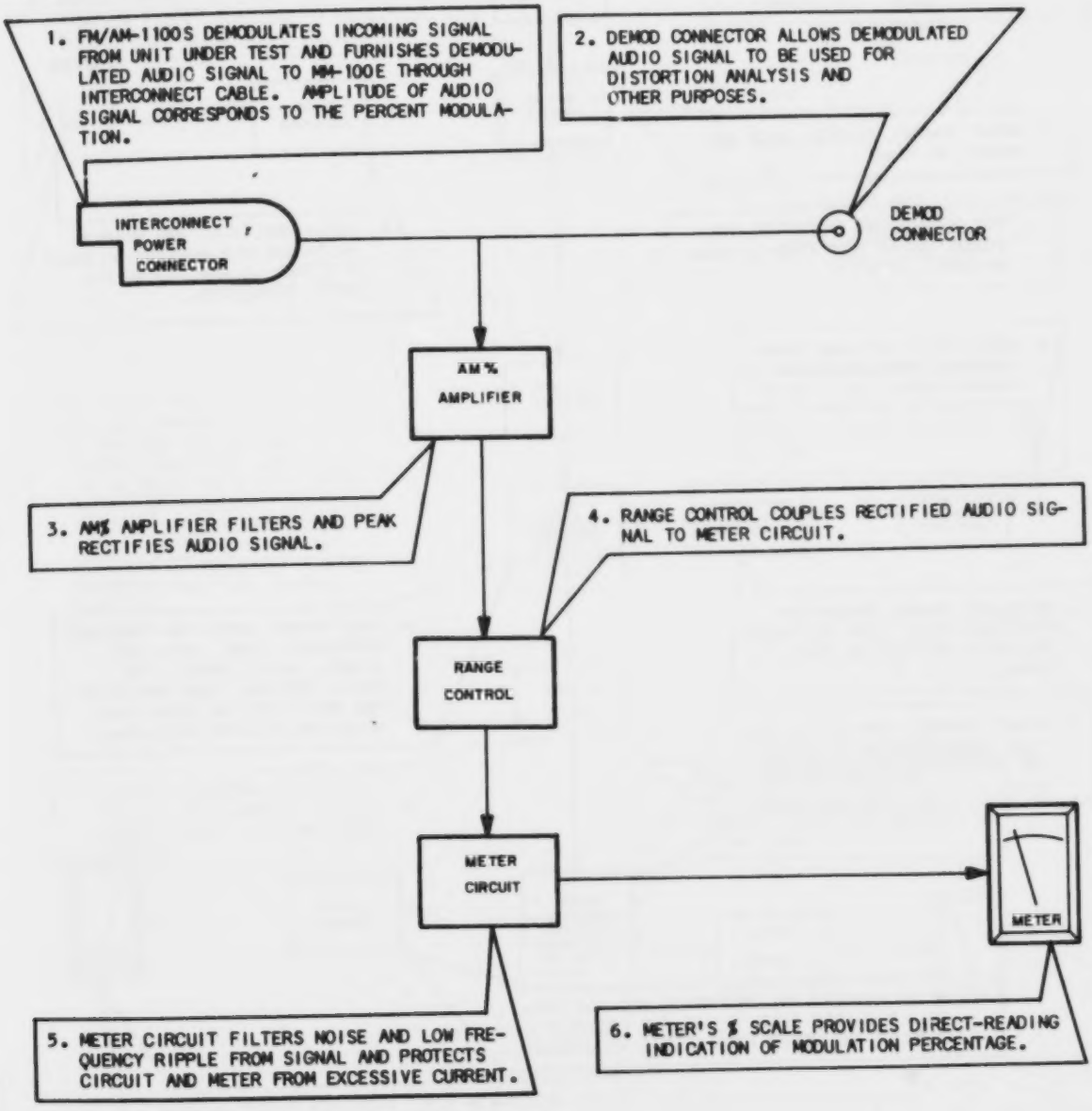

1. FM/AM-1100S DEMODULATES INCOMING SIGNAL FROM UNIT UNDER TEST AND FURNISHES DEMODULATED AUDIO SIGNAL TO MM-100E THROUGH INTERCONNECT CABLE. AMPLITUDE OF AUDIO SIGNAL CORRESPONDS TO THE PERCENT MODULATION.
2. DEMOD CONNECTOR ALLOWS DEMODULATED AUDIO SIGNAL TO BE USED FOR DISTORTION ANALYSIS AND OTHER PURPOSES.
INTERCONNECT POWER CONNECTOR
DEMOD CONNECTOR
AM% AMPLIFIER
3. AM% AMPLIFIER FILTERS AND PEAK RECTIFIES AUDIO SIGNAL.
4. RANGE CONTROL COUPLES RECTIFIED AUDIO SIGNAL TO METER CIRCUIT.
RANGE CONTROL
METER CIRCUIT
METER
5. METER CIRCUIT FILTERS NOISE AND LOW FREQUENCY RIPPLE FROM SIGNAL AND PROTECTS CIRCUIT AND METER FROM EXCESSIVE CURRENT.
6. METER'S % SCALE PROVIDES DIRECT-READING INDICATION OF MODULATION PERCENTAGE.

Figure 1-3 AM% Operation (MM-100E)

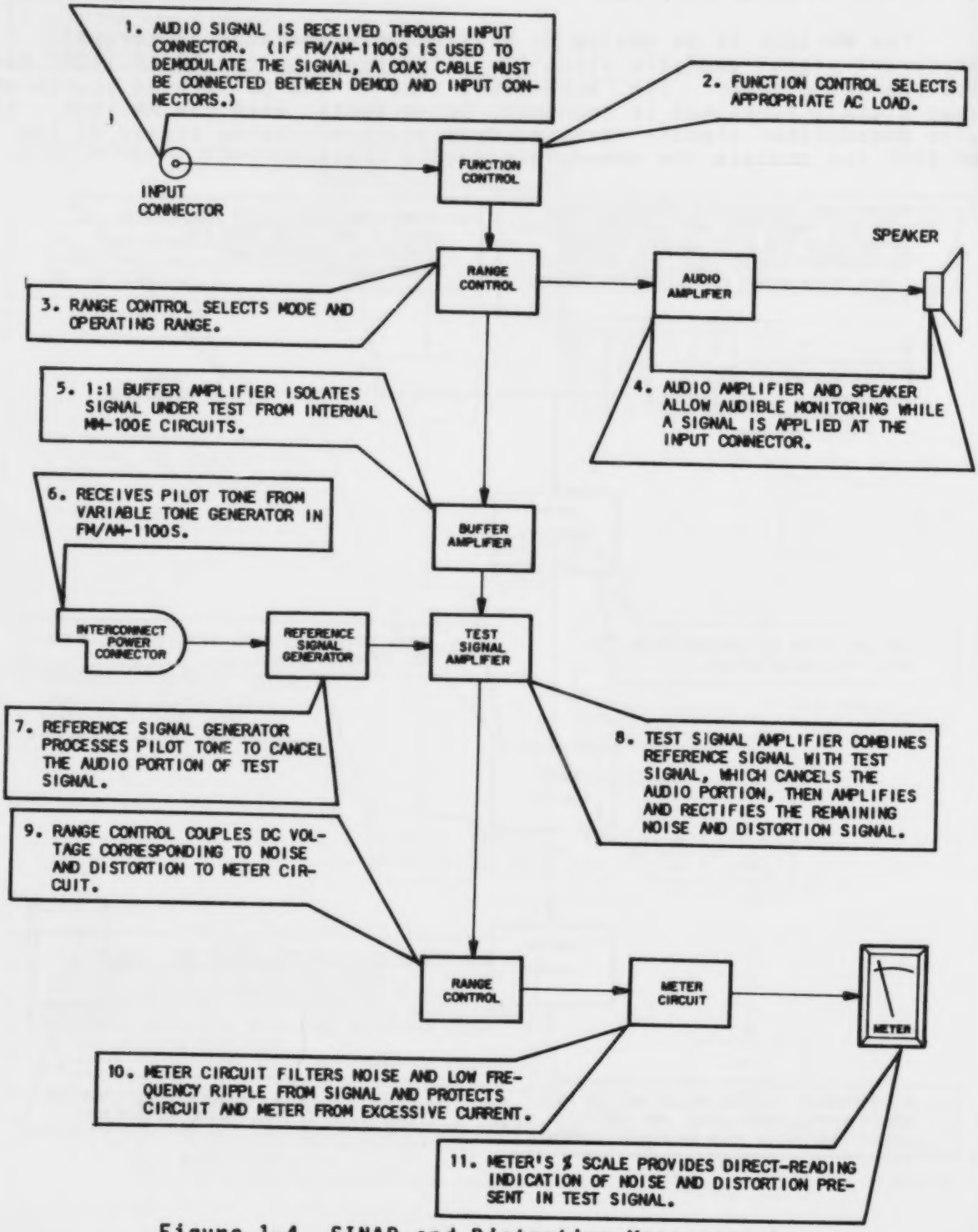

1. AUDIO SIGNAL IS RECEIVED THROUGH INPUT CONNECTOR. (IF FM/AM-1100S IS USED TO DEMODULATE THE SIGNAL, A COAX CABLE MUST BE CONNECTED BETWEEN DEMOD AND INPUT CONNECTORS.)
2. FUNCTION CONTROL SELECTS APPROPRIATE AC LOAD.
INPUT CONNECTOR
FUNCTION CONTROL
SPEAKER
RANGE CONTROL
AUDIO AMPLIFIER
3. RANGE CONTROL SELECTS MODE AND OPERATING RANGE.
4. AUDIO AMPLIFIER AND SPEAKER ALLOW AUDIBLE MONITORING WHILE A SIGNAL IS APPLIED AT THE INPUT CONNECTOR.
5. 1:1 BUFFER AMPLIFIER ISOLATES SIGNAL UNDER TEST FROM INTERNAL MM-100E CIRCUITS.
6. RECEIVES PILOT TONE FROM VARIABLE TONE GENERATOR IN FM/AM-1100S.
BUFFER AMPLIFIER
INTERCONNECT POWER CONNECTOR
REFERENCE SIGNAL GENERATOR
TEST SIGNAL AMPLIFIER
7. REFERENCE SIGNAL GENERATOR PROCESSES PILOT TONE TO CANCEL THE AUDIO PORTION OF TEST SIGNAL.
8. TEST SIGNAL AMPLIFIER COMBINES REFERENCE SIGNAL WITH TEST SIGNAL, WHICH CANCELS THE AUDIO PORTION, THEN AMPLIFIES AND RECTIFIES THE REMAINING NOISE AND DISTORTION SIGNAL.
9. RANGE CONTROL COUPLES DC VOLTAGE CORRESPONDING TO NOISE AND DISTORTION TO METER CIRCUIT.
RANGE CONTROL
METER CIRCUIT
METER
10. METER CIRCUIT FILTERS NOISE AND LOW FREQUENCY RIPPLE FROM SIGNAL AND PROTECTS CIRCUIT AND METER FROM EXCESSIVE CURRENT.
11. METER'S % SCALE PROVIDES DIRECT-READING INDICATION OF NOISE AND DISTORTION PRESENT IN TEST SIGNAL.

Figure 1-4 SINAD and Distortion Measurement Operation (MM-100E)

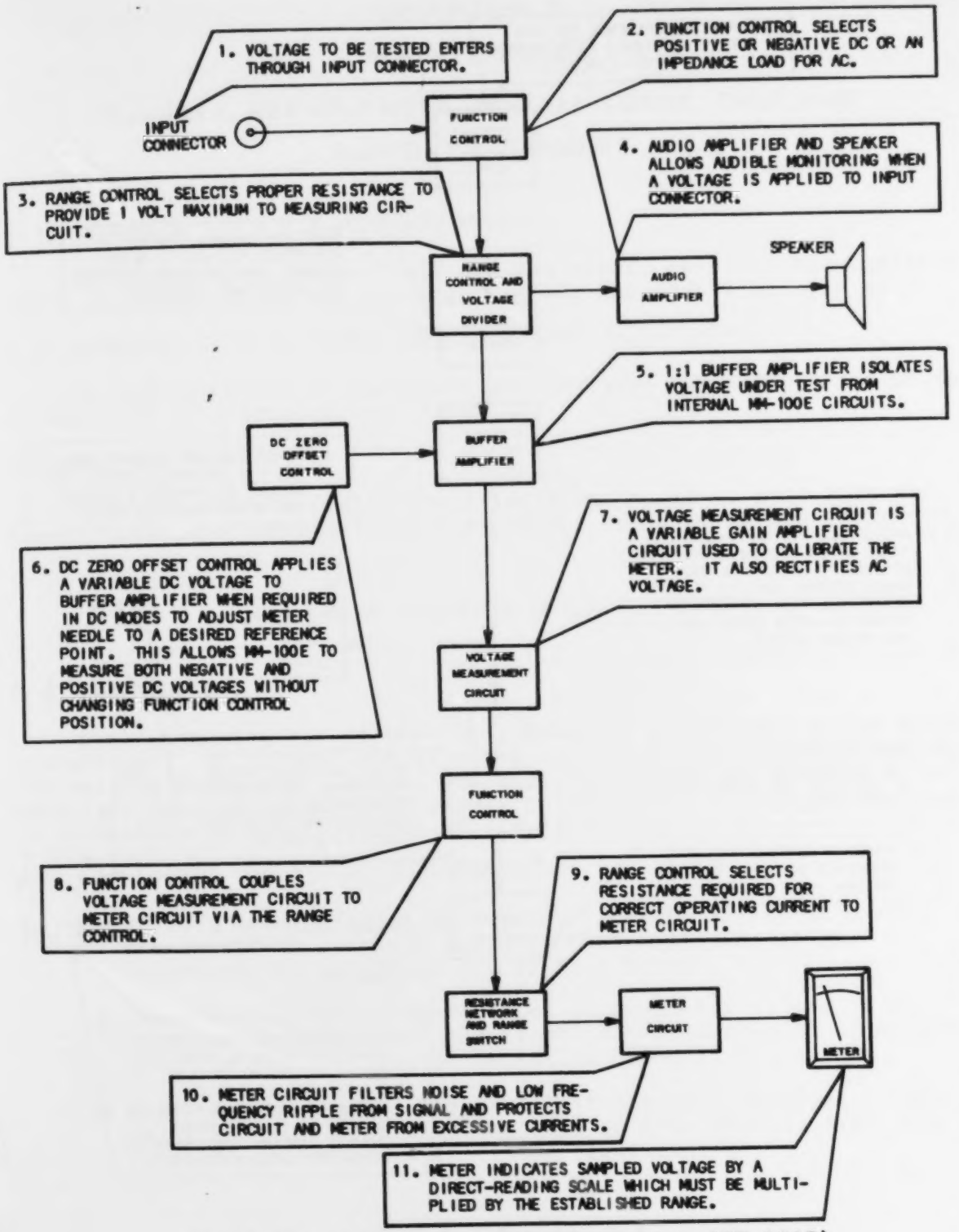

1. VOLTAGE TO BE TESTED ENTERS THROUGH INPUT CONNECTOR.
2. FUNCTION CONTROL SELECTS POSITIVE OR NEGATIVE DC OR AN IMPEDANCE LOAD FOR AC.
INPUT CONNECTOR
FUNCTION CONTROL
4. AUDIO AMPLIFIER AND SPEAKER ALLOWS AUDIBLE MONITORING WHEN A VOLTAGE IS APPLIED TO INPUT CONNECTOR.
3. RANGE CONTROL SELECTS PROPER RESISTANCE TO PROVIDE 1 VOLT MAXIMUM TO MEASURING CIRCUIT.
SPEAKER
RANGE CONTROL AND VOLTAGE DIVIDER
AUDIO AMPLIFIER
5. 1:1 BUFFER AMPLIFIER ISOLATES VOLTAGE UNDER TEST FROM INTERNAL MM-100E CIRCUITS.
DC ZERO OFFSET CONTROL
BUFFER AMPLIFIER
7. VOLTAGE MEASUREMENT CIRCUIT IS A VARIABLE GAIN AMPLIFIER CIRCUIT USED TO CALIBRATE THE METER. IT ALSO RECTIFIES AC VOLTAGE.
6. DC ZERO OFFSET CONTROL APPLIES A VARIABLE DC VOLTAGE TO BUFFER AMPLIFIER WHEN REQUIRED IN DC MODES TO ADJUST METER NEEDLE TO A DESIRED REFERENCE POINT. THIS ALLOWS MM-100E TO MEASURE BOTH NEGATIVE AND POSITIVE DC VOLTAGES WITHOUT CHANGING FUNCTION CONTROL POSITION.
VOLTAGE MEASUREMENT CIRCUIT
FUNCTION CONTROL
8. FUNCTION CONTROL COUPLES VOLTAGE MEASUREMENT CIRCUIT TO METER CIRCUIT VIA THE RANGE CONTROL.
9. RANGE CONTROL SELECTS RESISTANCE REQUIRED FOR CORRECT OPERATING CURRENT TO METER CIRCUIT.
RESISTANCE NETWORK AND RANGE SWITCH
METER CIRCUIT
METER
10. METER CIRCUIT FILTERS NOISE AND LOW FREQUENCY RIPPLE FROM SIGNAL AND PROTECTS CIRCUIT AND METER FROM EXCESSIVE CURRENTS.
11. METER INDICATES SAMPLED VOLTAGE BY A DIRECT-READING SCALE WHICH MUST BE MULTIPLIED BY THE ESTABLISHED RANGE.

Figure 1-5 AC/DC Voltmeter Operation (MM-100E)

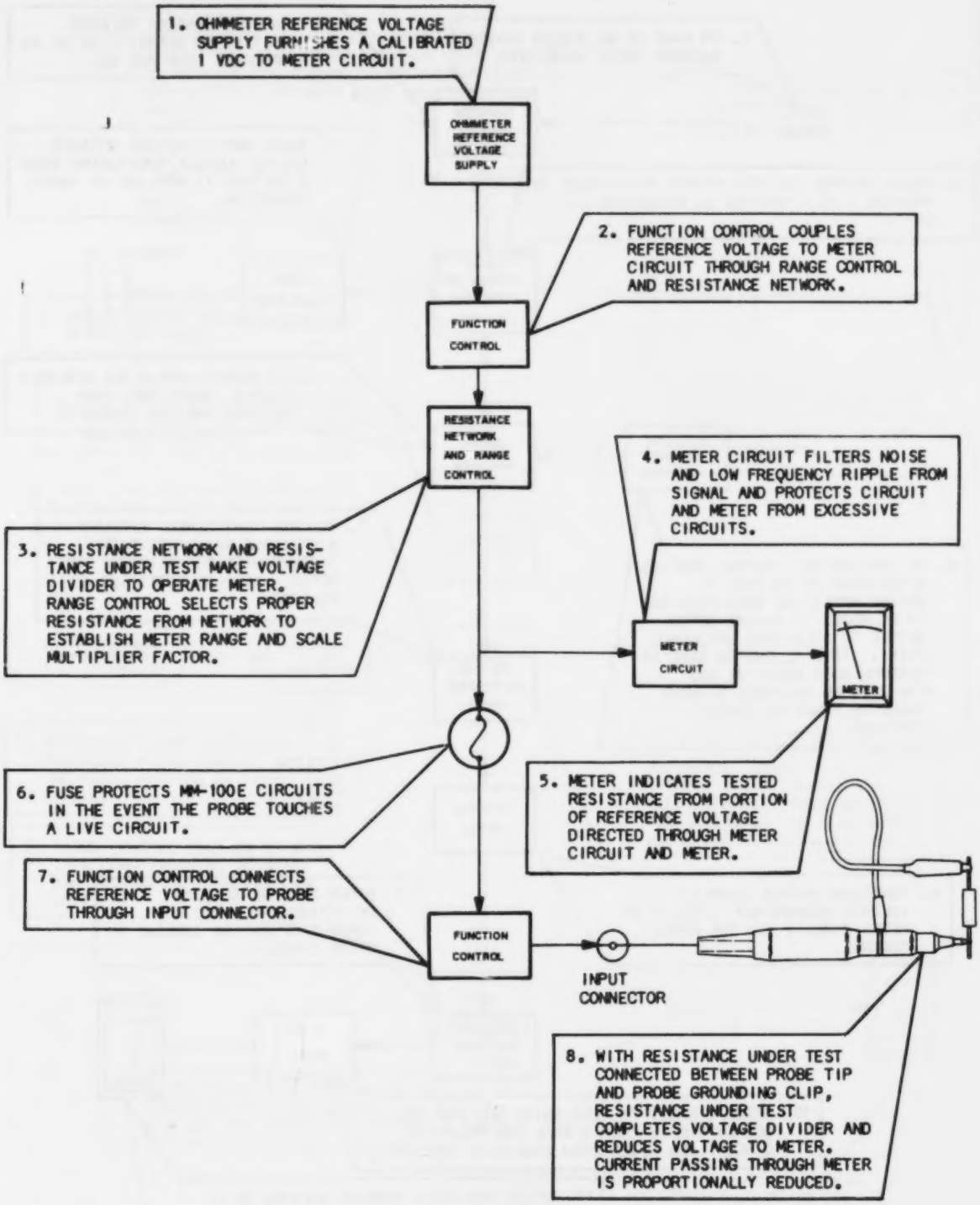

1. OHMMETER REFERENCE VOLTAGE SUPPLY FURNISHES A CALIBRATED 1 VDC TO METER CIRCUIT.
OHMMETER REFERENCE VOLTAGE SUPPLY
2. FUNCTION CONTROL COUPLES REFERENCE VOLTAGE TO METER CIRCUIT THROUGH RANGE CONTROL AND RESISTANCE NETWORK.
FUNCTION CONTROL
RESISTANCE NETWORK AND RANGE CONTROL
3. RESISTANCE NETWORK AND RESISTANCE UNDER TEST MAKE VOLTAGE DIVIDER TO OPERATE METER. RANGE CONTROL SELECTS PROPER RESISTANCE FROM NETWORK TO ESTABLISH METER RANGE AND SCALE MULTIPLIER FACTOR.
4. METER CIRCUIT FILTERS NOISE AND LOW FREQUENCY RIPPLE FROM SIGNAL AND PROTECTS CIRCUIT AND METER FROM EXCESSIVE CIRCUITS.
METER CIRCUIT
METER
5. METER INDICATES TESTED RESISTANCE FROM PORTION OF REFERENCE VOLTAGE DIRECTED THROUGH METER CIRCUIT AND METER.
6. FUSE PROTECTS MM-100E CIRCUITS IN THE EVENT THE PROBE TOUCHES A LIVE CIRCUIT.
7. FUNCTION CONTROL CONNECTS REFERENCE VOLTAGE TO PROBE THROUGH INPUT CONNECTOR.
FUNCTION CONTROL
INPUT CONNECTOR
8. WITH RESISTANCE UNDER TEST CONNECTED BETWEEN PROBE TIP AND PROBE GROUNDING CLIP, RESISTANCE UNDER TEST COMPLETES VOLTAGE DIVIDER AND REDUCES VOLTAGE TO METER. CURRENT PASSING THROUGH METER IS PROPORTIONALLY REDUCED.

Figure 1-6 Ohmmeter Operation (MM-100E)

# CHAPTER 2
# MAINTENANCE

## Section I, REPAIR PARTS, SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

### 2-1. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

### 2-2. SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT.

No special tools or equipment are required for maintenance of the AN/GRM-114A at organizational level.

### 2-3. REPAIR PARTS.

Repair parts are listed and illustrated in TM 11-6625-3016-24P-1, Repair Parts and Special Tools List, Radio Test Set AN/GRM-114A.

## Section II, SERVICE UPON RECEIPT

### 2-4. UNPACKING.

When unpacking the AN/GRM-114A, refer to paragraph 1-9 for safety precautions. Be careful not to damage the shipping container and/or the packing materials. Return the empty container and packing materials through established supply channels or, if applicable, use it to package an unserviceable AN/GRM-114A.

### 2-5. CHECKING UNPACKED EQUIPMENT.

- Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage as instructed in paragraph 1-2 of this manual.
- Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of TM 38-750 (TAMMS).
- Check to see whether the equipment has been modified. Refer to DA PAM 310-1 Consolidated List of Army Manuals and Blank Forms to determine modification requirements.

## 2-6. PRELIMINARY SERVICING AND ADJUSTMENT REQUIREMENTS.

a. The AN/GRM-114A is supplied without the internal battery included. You must obtain a battery separately through established supply channels. Refer to TM 11-6625-3016-10-1, Operator's Manual, Radio Test Set AN/GRM-114A, Appendix B, Components of End Item, item number 13, for battery description. Paragraph 2-10 of this manual provides installation instructions.

b. After the battery has been installed, connect the AN/GRM-114A to your AC power distribution and allow the set to charge the battery for 24 hours.

**NOTE**

Subsequent recharging should take less time, typically up to 15 hours, since maximum discharge through operation is only down to 11 volts.

c. Before placing the AN/GRM-114A in service, perform all preventive maintenance checks and services described in Section III of this chapter. Thoroughly check the operation of the set by performing all operational checks described in Section V of this chapter.

## SECTION III, PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

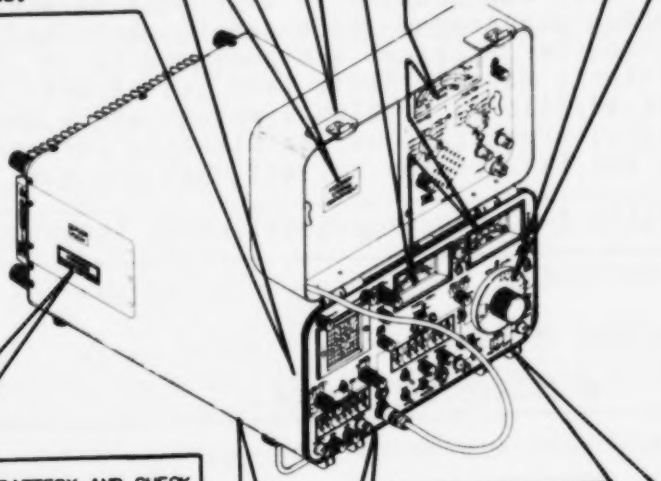
## 2-7. GENERAL.

- Performing the Preventive Maintenance Checks and Services (PMCS) assures you that your AN/GRM-114A is always ready for use. The PMCS procedures in Table 2-1 must be performed every month. In addition, the Operator's Manual TM 11-6625-3016-10-1 has PMCS procedures which are required each time the set is used, and others which are required weekly. You must perform the procedures in TM 11-6625-3016-10-1 as part of the monthly PMCS. You must have your AN/GRM-114A calibrated in accordance with TB 43-180 and TB 43-180-1.

- The Item No. column in Table 2-1 gives you the sequence you should follow in performing the PMCS procedures. When you record the results of your PMCS M DA Form 2404, Equipment Inspection and Maintenance Worksheet, use these item numbers for your record item numbers.

- Perform the PMCS procedures described in TM 11-6625-3016-10-1 simultaneously with the operational checks described in Section V of this manual.

Table 2-1 Organizational Preventive Maintenance Checks and Services Monthly Schedule

| ITEM NO. | ITEM TO BE INSPECTED | PROCEDURE | EQUIPMENT IS NOT READY/ AVAILABLE IF: |
|---|---|---|---|
| 1 | EXTERIOR | EXAMINE AN/GRM-114A FOR MECHANICAL DEFECTS. CHECK FOR LOOSE OR DAMAGED HINGES. CHECK METERS FOR CRACKS IN CASE. EXAMINE TEST PROBE, POWER CORDS AND PLUGS FOR CUTS AND DAMAGED CONNECTORS. WITH AN/GRM-114A UNPLUGGED, PLACE AUTO ZERO/OFF/BATT SWITCH IN "BATT" POSITION AND READ BATTERY LEVEL ON MODULATION/WATTS METER. EXAMINE SEAL FOR CUTS, TEAR AND SEPARATION FROM CASE.  REMOVE BATTERY AND CHECK FOR SWELLING OR CRACKED CASE. CLEAN ALL DIRT AND CORROSION FROM CONNECTOR TERMINALS. CHECK LATCHES AND STAND FOR MISSING OR LOOSE RIVETS AND FOR OTHER DAMAGE. LIGHTLY SCRUB FOREIGN MATTER FROM CASE, FRONT PANEL AND REAR PANEL USING CLEAN, LINT-FREE CLOTH DAMPENED WITH TRICHLORO-TRIFLOUROETHANE. TOUCH UP WORN OR CHIPPED PAINT TO PREVENT CORROSION. DO NOT PAINT REAR PANEL HEAT SINK. SEE WARNING ON INSIDE OF FRONT COVER. CHECK THAT ALL CONTROLS AND SWITCHES ARE TIGHT IN FRONT PANEL. EXAMINE ALL CONTROLS FOR OUTWARD DAMAGE. OPERATION SHOULD BE SMOOTH THROUGHOUT TRAVEL, WITH SWITCHES DISTINCTLY ENTERING ALL DETENT POSITIONS. KNOBS SHOULD BE TIGHT AND INDICATOR LINES MUST ALIGN WITH CORRESPONDING FRONT PANEL MARKINGS. | METER CASES ARE CRACKED. CONNECTORS OR CORDS ARE DAMAGED. BATTERY LEVEL IS LESS THAN 11 VOLTS. RECHARGING FROM THIS LEVEL REQUIRES AT LEAST 10 HOURS. BATTERY CASE IS SWELLED OR CRACKED OR TERMINALS CORRODED. ANY SWITCH OR CONTROL IS DEFECTIVE. |
| 2 | OPERATION | PERFORM ALL PMCS PROCEDURES REQUIRED IN TM 11-6625-3016-10-1 WHILE PERFORMING ALL OPERATING CHECKS IN SECTION V OF THIS CHAPTER. | AN/GRM-114A FAILS TO PASS ANY OPERATING TEST. |

- If you find a mechanical or operational failure which you can not correct, you must send your AN/GRM-114A to your Area Calibration and Repair Center (ACRC).

## Section IV, TROUBLESHOOTING

### 2-8. GENERAL.

- Organizational level repair consists of replacing blown fuses, battery connector adapter, damaged detachable power cords and probe and aligning and tightening loose knobs. Therefore, if your AN/GRM-114A develops an apparent malfunction, there is little you can do. However, before you ship your set to ACRC, always perform the operational checks described in Section V to be sure the problem is with your AN/GRM-114A. Troubleshooting procedures which can be performed by operator or maintenance personnel are provided in TM 11-6625-3016-10-1, Operator's Manual, Radio Test Set AN/GRM-114A. Table 2-2 lists additional problem symptoms which may result from failures organizational maintenance personnel can correct, what the failure may be, and what you must do to correct it.

Table 2-2 Organizational Level Troubleshooting

| STEP | MALFUNCTION<br>↳ TEST OR INSPECTION<br>↳ CORRECTIVE ACTION |
|---|---|
| 1. | Battery does not accept charge. |
| | Battery temperature exceeds charging limit. |
| | If ambient temperature is below 95° F (35° C), leave set connected to external power and allow it to cool. Charging should resume automatically. |
| | If ambient temperature exceeds 95° F (35° C), disconnect external power and resume charging in a cooler environment. |
| | Battery fuse blown. |
| | Remove battery and check fuse. Replace if blown. If fuse blows again during charging or during the next operation of the AN/GRM-114A using the battery for power, return AN/GRM-114A to ACRC for repair. |

Table 2-2 Organizational Level Troubleshooting (Continued)

| STEP | MALFUNCTION<br>↳ TEST OR INSPECTION<br>↳ CORRECTIVE ACTION |
|---|---|
| 1. | (Cont'd)<br>Battery connector adapter defective.<br>Test diode in battery connector adapter as described in Table 2-14. If diode is defective, replace adapter.<br>Battery charging circuit defective.<br>Send AN/GRM-114A to ACRC for repair of battery charging circuit.<br>Defective battery.<br>Replace battery. |
| 2. | MM-100E Meter does not register when using probe.<br>Check continuity of probe.<br>If either, probe tip-to-connector center pin or grounding clip-to-connector housing fails continuity test, replace probe. |

## Section V, MAINTENANCE

### 2-9. BATTERY REMOVAL (SEE FIGURE 2-1).

**CAUTION**

PWR/OFF/BATT SWITCH MUST BE IN "OFF" POSITION AND ALL POWER CORDS TO AN/GRM-114A MUST BE DISCONNECTED BEFORE REMOVING BATTERY.

- Remove two screws securing battery access door to FM/AM-1100S rear panel and remove access door.
- Pull end of battery removal strap until battery connector adapter is outside the battery compartment.

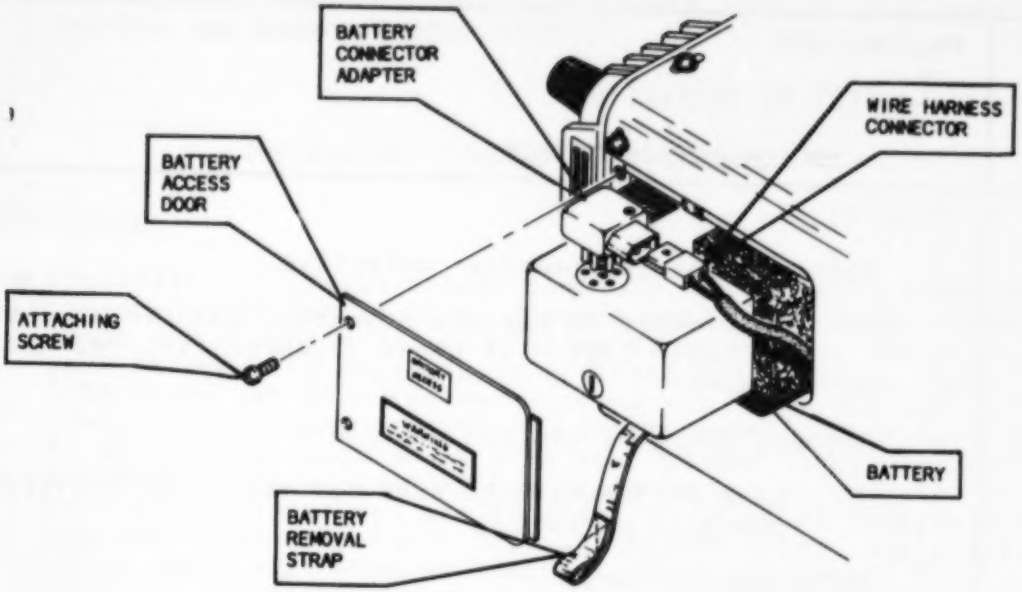



Figure 2-1 Battery Removal and Installation

- Unplug battery connector adapter from battery.

**CAUTION**

WHEN AN/GRM-114A IS OPERATED WITHOUT BATTERY INSTALLED, DISCONNECT BATTERY CONNECTOR ADAPTER FROM WIRE HARNESS PLUG AND STOW ADAPTER IN LID ASSEMBLY.

- Remove battery from battery compartment.

## 2-10. BATTERY INSTALLATION (SEE FIGURE 2-1).

**CAUTION**

PWR/OFF/BATT SWITCH MUST BE IN "OFF" POSITION AND ALL POWER CORDS TO AN/GRM-114A MUST BE DISCONNECTED BEFORE INSTALLING BATTERY.

- Insert battery into battery compartment approximately half way, with the plug end exposed.

**NOTE**

Be sure battery removal strap goes behind battery, with end of strap exposed, to grasp when removing the battery.

- Align positioning dot on battery connector adapter with +A2 indicator line on battery and plug battery connector adapter into battery.

**NOTE**

If battery connector adapter has been stowed in the AN/GRM-114A lid, or if it has just been replaced, connect the wire harness plug into the battery connector adapter.

- Complete insertion of battery into battery compartment.
- Replace battery access door and install two attaching screws.

## 2-11. BATTERY CHARGING.

- The AN/GRM-114A provides automatic battery charging as long as the set is connected to an external AC power source. The battery charger provides the maximum charging rate when the battery is discharged to 11 V, and reduces the charging rate to provide only a float charge when the battery is fully charged.
- The battery contains a temperature limit switch to prevent possible damage caused by charging when the battery temperature exceeds 100° F (38° C). When the AN/GRM-114A is operating, the power supply and rear panel heat sink raise the temperature within the battery compartment and battery charging may not occur. Therefore, in an ambient temperature above 60° F (16° C), when use of the battery is anticipated, monitor the battery level frequently and take adequate measures, such as charging when the set is not in use, to assure an adaquate battery charge level is attained.

## 2-12. BATTERY FUSE REPLACEMENT (SEE FIGURE 2-2).

- Remove battery from FM/AM-1100S according to instructions in paragraph 2-9, Battery Removal.
- Unscrew the fuseholder from the end of the battery marked "10 AMP FUSE". Remove the fuseholder, fuse and "O" ring seal.
- Remove blown fuse from fuseholder and discard fuse.
- Unscrew spare fuseholder from the end of the battery marked "SPARE FUSE". Remove the fuseholder, fuse and "O" ring seal.
- Install the spare fuse, fuseholder and "O" ring seal in the end of the battery marked "10 AMP FUSE".
- Install the empty fuseholder and "O" ring seal in the end of the battery marked in "SPARE FUSE".

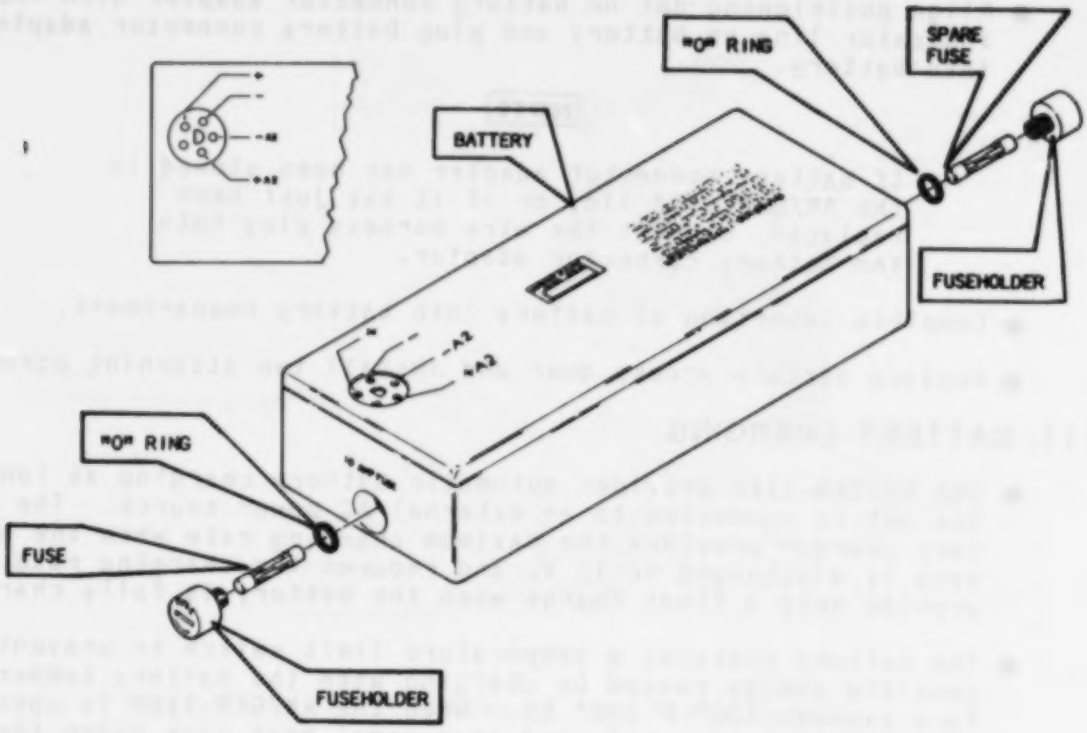



Figure 2-2 Battery Fuse Replacement (FM/AM-1100S)

- Reinstall the battery in the FM/AM-1100S according to instructions in paragraph 2-10, Battery Installation.

**NOTE**

As soon as possible, obtain a replacement 10 Amp, 32 V Normal Blow fuse and install it in the "SPARE FUSE" fuseholder according to the above procedures. See TM 11-6625-3016-10-1, Operator's Manual, Radio Test Set AN/GRM-114A, or TM 11-3016-24P-1, Repair Parts and Special Tools List, Radio Test Set AN/GRM-114A, for ordering information.

## 2-13. INTERNAL POWER AND AC LINE FUSE REPLACEMENT (FM/AM-1100S) FIGURE 2-3.

- Press inward firmly on the bottom of the fuseholder until you feel the toggling action of the retainer.
- Withdraw fuseholder and fuse from the socket.
- Pull fuse straight out of the fuseholder contacts.

- Insert replacement fuse into contacts of fuseholder. The Internal Power Fuse is rated at 7½ Amps, 32 V, Normal Blow. The AC Line Fuse is rated at 2 Amps, 250 V, Slow Blow. See TM 11-6625-3016-10-1, Operator's Manual, Radio Test Set AN/GRM-114A, or TM 11-6625-3016-24P-1, Repair Parts and Special Tools List, Radio Test Set AN/GRM-114A for ordering information.

**CAUTION**

BE SURE REPLACEMENT FUSE IS OF CORRECT RATING.

- Insert fuse and fuseholder into socket. Press firmly inward on the top of the fuseholder until you feel the toggling action of the retainer.

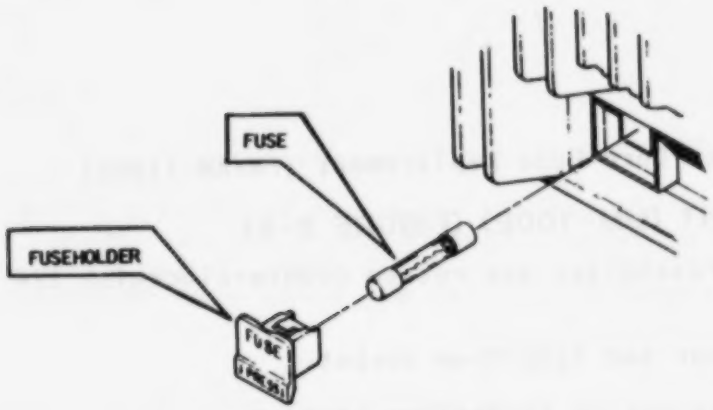



Figure 2-3 Internal Power and AC Line Fuse Replacement (FM/AM-1100S)

## 2-14. DC POWER CORD FUSE REPLACEMENT (FIGURE 2-4).

- Unscrew end cap from plug and remove contact and fuse.
- Insert replacement 7½ Amp, 32 V, Normal Blow fuse and reassemble contact and end cap. See TM 11-6625-3016-10-1, Operator's Manual, Radio Test Set AN/GRM-114A, or TM 11-6625-3016-24P-1, Repair Parts and Special Tools List, Radio Test Set AN/GRM-114A, for ordering information.

**CAUTION**

BE SURE REPLACEMENT FUSE IS OF CORRECT RATING.

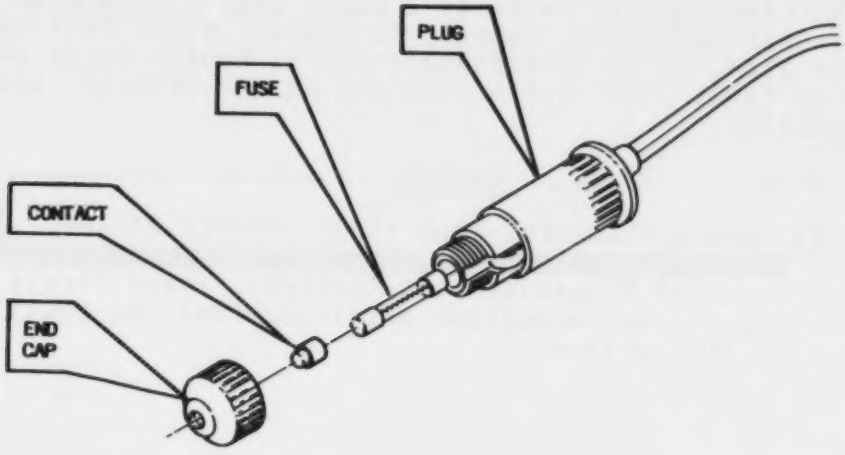



Figure 2-4 DC Power Cord Fuse Replacement (FM/AM-1100S)

## 2-15. FUSE REPLACEMENT (MM-100E) (FIGURE 2-5).

- Press firmly on fuseholder and rotate counterclockwise 1/4 turn.
- Withdraw fuseholder and fuse from socket.
- Pull fuse straight out of fuseholder contact.
- Insert replacement 1/32 A, 250 V, Fast Blow fuse into the contacts of the fuseholder. See TM 11-6625-3016-10-1, Operator's Manual, Ratio Test Set AN/GRM-114A, or TM 11-6625-3016-24P-1, Repair Parts and Special Tools List, Radio Test Set AN/GRM-114A for ordering information.

**CAUTION**

BE SURE REPLACEMENT FUSE IS OF CORRECT RATING.

- Align tabs on fuseholder contact with slots in socket and insert fuse and fuseholder into socket.

## 2-16. OPERATIONAL CHECKS.

- This section contains step-by-step test procedures for assessing the performance of your AN/GRM-114A. Use these procedures to test the set when you first receive it, for each monthly preventive maintenance test, and for troubleshooting when you think your set may not be working properly.

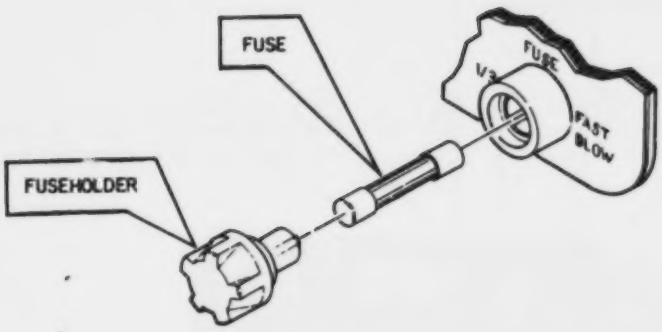



Figure 2-5 Fuse Replacement (MM-100E)

- All procedures contained in this section use only the front panel controls, the accessory probe and antenna. You can perform any of these tests within 6 to 10 minutes. Most tests can be made using the battery if necessary.

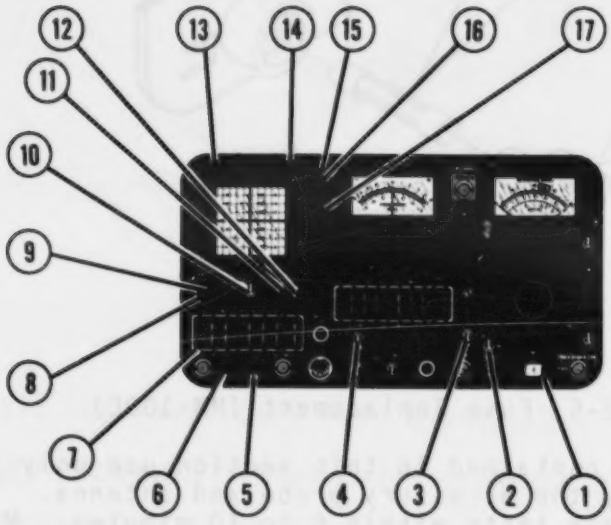
**NOTE**

If your AN/GRM-114A does not pass one or more of these tests, you should return it to Area Calibration and Repair Center (ACRC) for further testing and/or repair.

- Each test procedure provides a drawing showing all switches and controls, identified by key numbers, requiring a preset position. Below the drawing, each switch and control is identified by key number, and its required position is given. Every procedure starts with the AN/GRM-114A turned "OFF" to permit proper positioning of switches and controls before starting the test procedure. Additional drawings show cable connections required between front panel connectors, and identify switches, controls and indicators referenced in the text.

Table 2-3 Oscilloscope and Dual Tone Generator Operational Check

INITIAL CONTROL SETTINGS




| KEY | CONTROL | INITIAL SETTING |
|---|---|---|
| 1 | PWR/OFF/BATT Switch | "OFF" |
| 2 | RCVR WIDE/MID/NARROW Switch | "WIDE" |
| 3 | GEN/RCVR Switch | "GEN" |
| 4 | AM/FM Switch | "AM" |
| 5 | VAR/OFF Control | Fully ccw, detent "OFF" |
| 6 | 1 kHz/OFF Control | Fully ccw, detent "OFF" |
| 7 | MODULATION FREQ Hz Thumbwheels | "01000.0" |
| 8 | DEV-VERT Control | "10 V/DIV" |
| 9 | DEV-VERT Vernier Control | Fully cw, in detent |
| 10 | AC/OFF/DC Switch | "DC" |
| 11 | SWEEP Control | "1" |
| 12 | SWEEP Vernier Control | Fully cw, in detent |
| 13 | INTENSITY Control | Midrange |
| 14 | FOCUS Control | Midrange |
| 15 | VERT Control | Midrange |
| 16 | ANALY DISPR Control | Fully ccw, in detent |
| 17 | HORIZ Control | Midrange |

Table 2-3 Oscilloscope and Dual Tone Generator Operational Check (Continued)

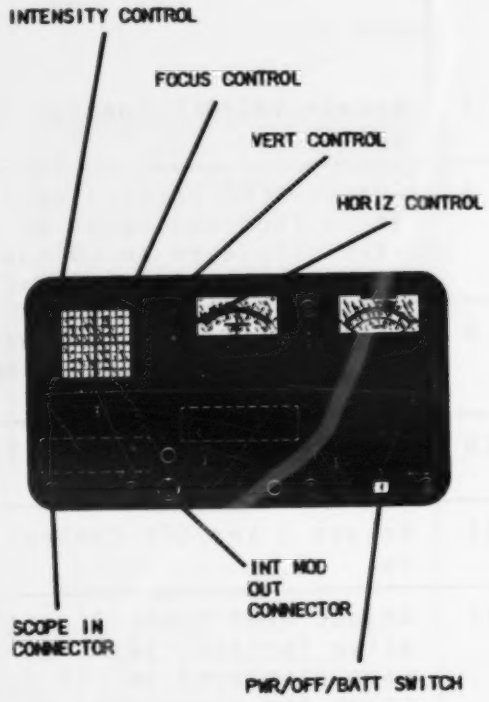
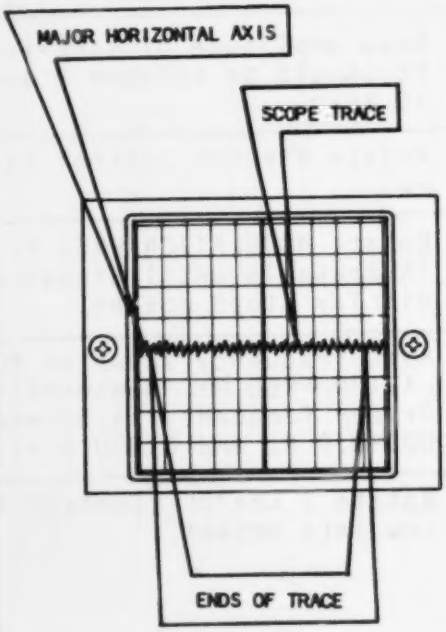
| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 1 | Connect probe between INT MOD OUT and SCOPE IN Connectors. |   |
| 2 | Set PWR/OFF/BATT Switch in either "PWR" or "BATT" position. Allow trace on CRT to become visible. | |
| 3 | Adjust INTENSITY Control until trace contrast is distinct. | |
| 4 | Adjust FOCUS Control until trace is sharply defined. | |
| 5 | Adjust VERT Control to center trace over the horizontal axis of CRT display. |   |
| 6 | Adjust HORIZ Control to center trace between outer edges of CRT. | |

Table 2-3 Oscilloscope and Dual Tone Generator Operational Check (Continued)

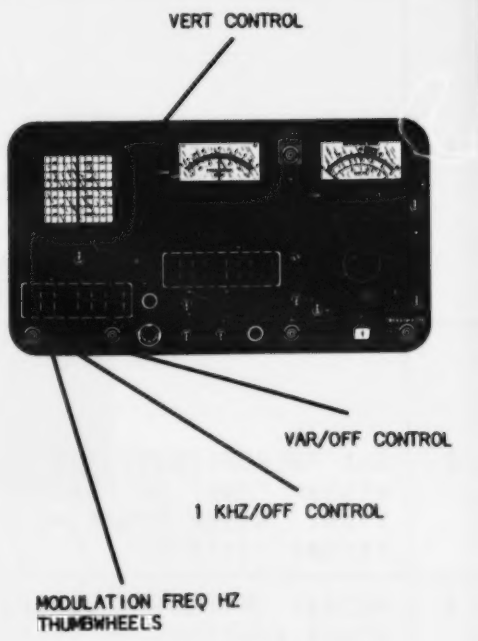
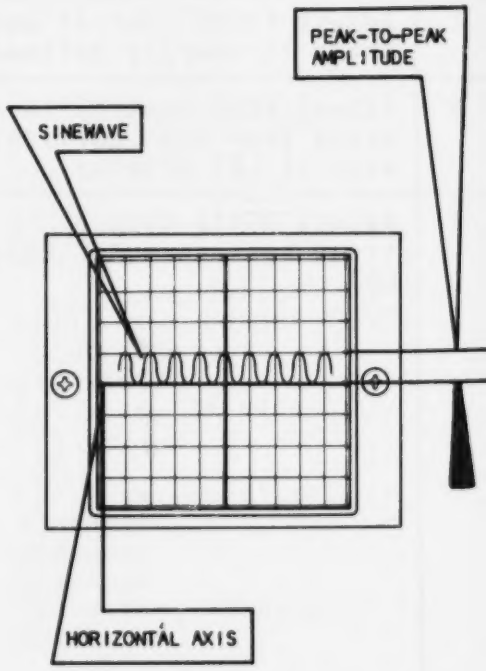
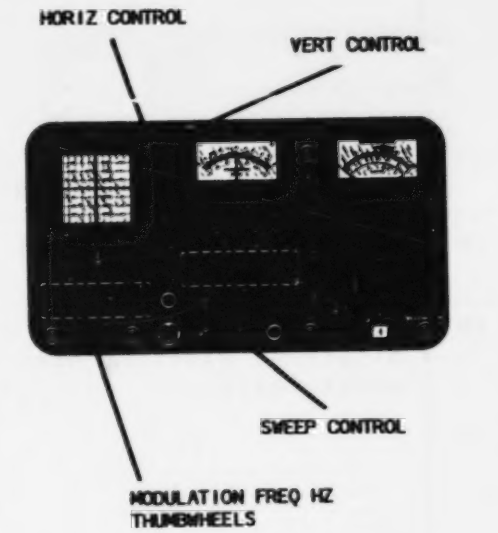
| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 7 | Rotate VAR/OFF Control fully cw. |   |
| 8 | Adjust VERT Control until negative (bottom) peaks of sinewave displayed on CRT just touch the horizontal axis. | |
| 9 | Read amplitude of sinewave. It should be between 8 and 16 Vp-p. | |
| 10 | Rotate VAR/OFF Control fully ccw into detent. | |
| 11 | Rotate 1 kHz/OFF Control fully cw. | |
| 12 | Adjust VERT Control until negative (bottom) peaks of sinewave displayed on CRT just touch the horizontal axis. | |
| 13 | Read amplitude of sinewave. It should be between 8 and 16 Vp-p. |   |
| 14 | Rotate VAR/OFF Control fully cw. | |
| 15 | Rotate MODULATION FREQ Hz Thumbwheels until sinewave display stops moving. | |
| 16 | Read frequency shown on MODULATION FREQ Hz Thumbwheels. Proper frequency is between 00980.0 Hz and 01020.0 Hz. | |
| 17 | Rotate 1 kHz/OFF Control fully ccw into detent. | |

Table 2-3 Oscilloscope and Dual Tone Generator Operational Check (Continued)

| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 18 | Rotate MODULATION FREQ Hz Thumbwheels to display "01000.0". | |
| 19 | Adjust VERT Control until positive (top) peaks of sinewave just touch the horizontal axis. | |
| 20 | Adjust HORIZ Control to center one of the positive peaks over the vertical axis. | |
| 21 | Note position of the first peak to the right of the vertical axis. It should center over the first major vertical division to the right of the vertical axis, but may be up to 2 minor divisions on either side of the major vertical division. | |
| 22 | Rotate MODULATION FREQ Hz Thumbwheels to "10000.0". | |
| 23 | Rotate SWEEP Control to ".1" position. | |
| 24 | Adjust HORIZ Control to center one of the positive peaks over the vertical axis. | |
| 25 | Note position of the first peak to the right of the vertical axis. It should center over the first major vertical division to the right of the vertical axis, but may be up to 2 minor divisions on either side of the major vertical division. | |
| 26 | Verify that all the sinewave peaks are within 1 minor division above or below the horizontal axis. | |



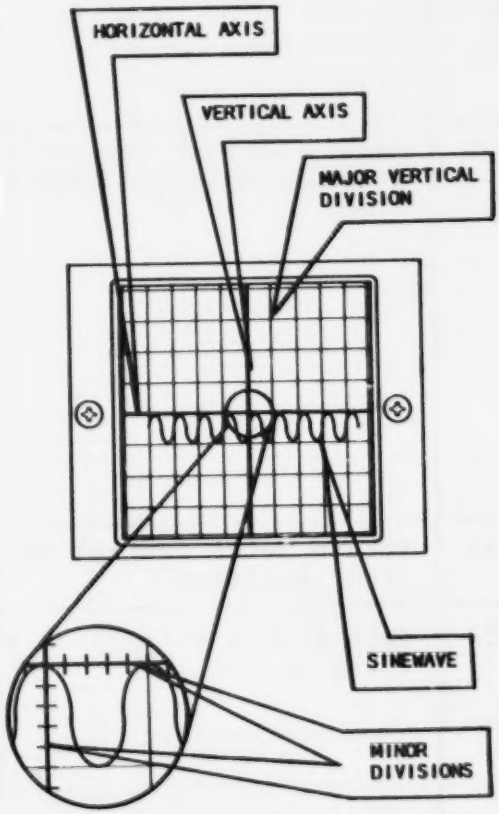



Table 2-3 Oscilloscope and Dual Tone Generator Operational Check (Continued)

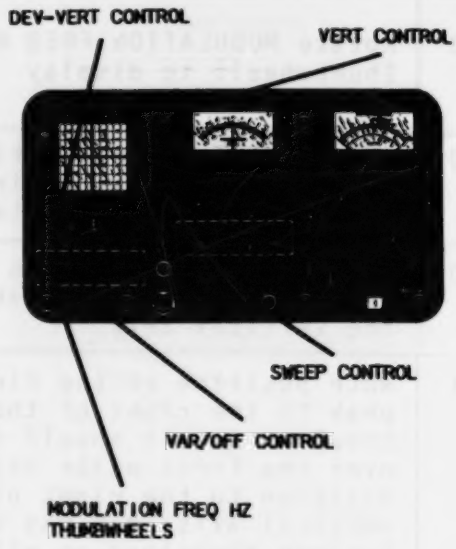
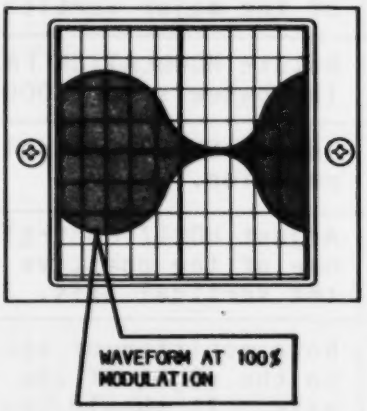
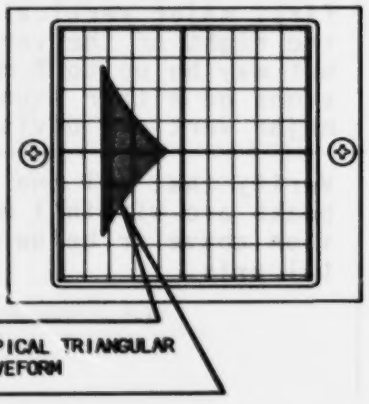
| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 27 | Rotate MODULATION FREQ Hz Thumbwheels to "01000.0". |  |
| 28 | Rotate DEV-VERT Control to "15" position. | |
| 29 | Adjust VERT Control to center displayed waveform over horizontal axis. | |
| 30 | Adjust VAR/OFF Control ccw until waveform displays 100% modulation. |  |
| 31 | Rotate SWEEP Control to "MOD FREQ" position. | |
| 32 | Note that a triangular waveform shows on the CRT. |  |

Table 2-3. Oscilloscope and Dual Tone Generator Operational Check- Continued

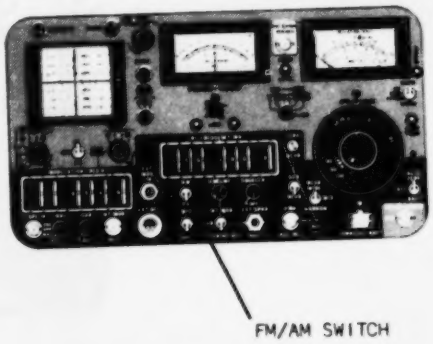
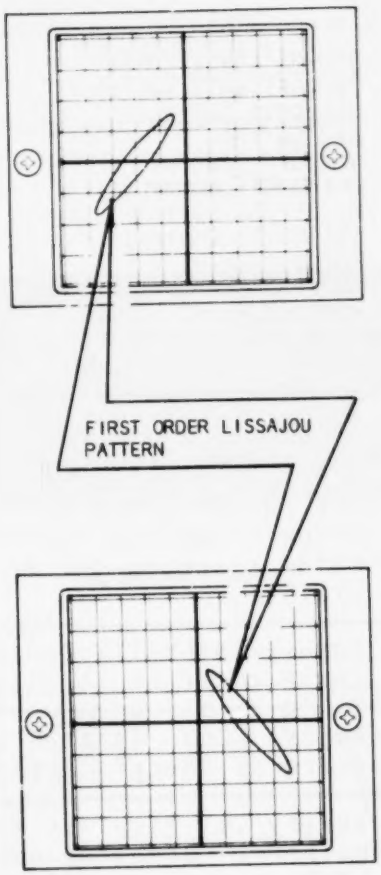
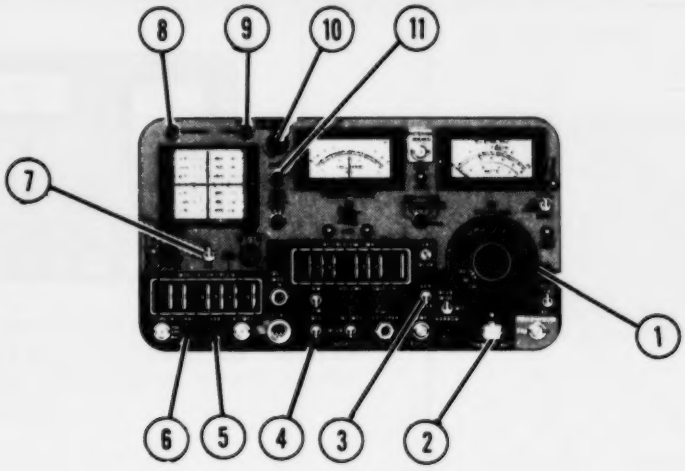
| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 33 | Set AM/FM Switch in "FM" position. |  |
| 34 | Verify that display on CRT is a first order Lissajou pattern.<br><br>**NOTE**<br><br>Depending upon internal phase relationships, either Lissajou pattern may be displayed. Horizontal adjustment may position the pattern on either side of the vertical axis. |  |

Table 2-4. Spectrum Analyzer Operational Check

INITIAL CONTROL SETTINGS




| KEY | CONTROL | INITIAL SETTING |
|---|---|---|
| 1 | BFO-RF LEVEL Control | " -80 dBm |
| 2 | PWR/OFF/BATT Switch | "OFF" |
| 3 | GEN/RCVR Switch | "RCVR |
| 4 | BFO Switch | "ON" |
| 5 | VAR/OFF Control | Fully ccw, detent "OFF" |
| 6 | 1 kHz/OFF Control | "OFF" |
| 7 | AC/OFF/DC Switch | "AC" |
| 8 | INTENSITY Control | Midrange |
| 9 | FOCUS Control | Midrange |
| 10 | ANALY DISPR Control | Fully ccw, out of detent |
| 11 | HORIZ Control | Midrange |

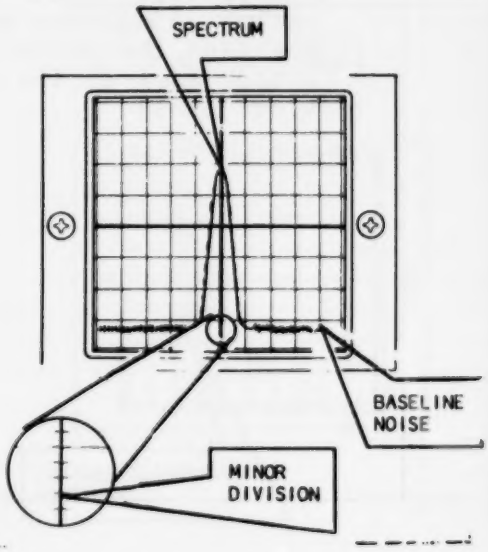
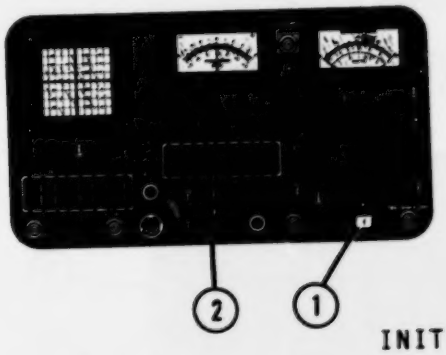
| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 1 | Set PWR/OFF/BATT Switch in either "PWR" or "BATT" position. Allow trace on CRT to become visible. |  |
| 2 | Adjust INTENSITY Control until trace contrast is distinct. | |
| 3 | Adjust FOCUS Control until trace is sharply defined. | |
| 4 | Verify CRT displays spectrum pattern. Baseline noise should be less than two minor vertical divisions in amplitude. | |

Table 2-5 Frequency Synthesizer Operational Check

INITIAL CONTROL SETTINGS




| KEY | CONTROL | INITIAL SETTING |
|---|---|---|
| 1 | PWR/OFF/BATT Switch | "OFF" |
| 2 | RF FREQUENCY MHz Thumbwheels | "099 000 0" |

| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 1 | Set PWR/OFF/BATT Switch in either "PWR" or "BATT" position. Verify that both phase lock lamps provide steady illumination. | |
| 2 | Rotate 100 MHz Thumbwheel into each detent from 1 through 9. High frequency phase lock lamp may momentarily go out or flash, but should return to steady illumination with each position. | |
| 3 | Rotate all RF FREQUENCY MHz Thumbwheels to "000 000 0". Verify both phase lock lamps provide steady illumination. | |
| 4 | Simultaneously rotate all RF FREQUENCY MHz Thumbwheels into each detent 1 through 9. Either or both phase lock lamps may momentarily go out or flash, but should return to steady illumination with each position. | |

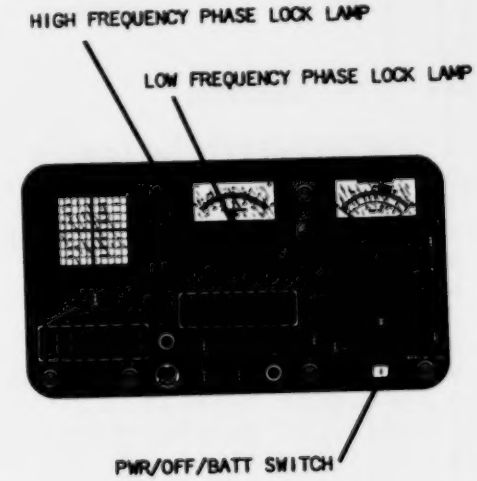
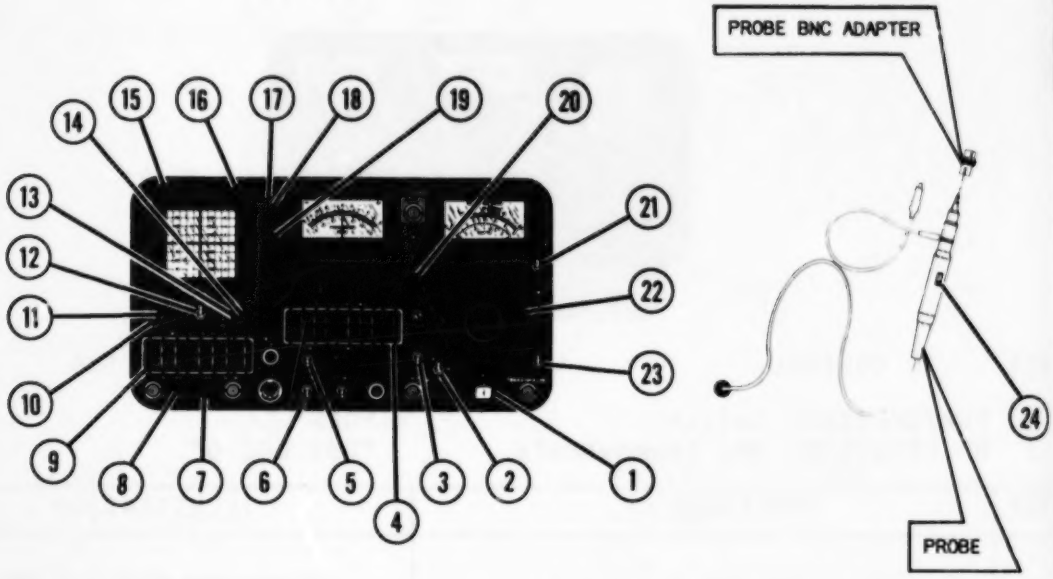


Table 2-6 Signal Generator Operational Check

INITIAL CONTROL SETTINGS




| KEY | CONTROL | INITIAL SETTING |
|---|---|---|
| 1 | PWR/OFF/BATT Switch | "OFF" |
| 2 | RCVR WIDE/MID/NARROW Switch | "MID" |
| 3 | GEN/RCVR Switch | "GEN" |
| 4 | RF FREQUENCY MHz Thumbwheels | "000 100 0" |
| 5 | AM/FM Switch | "FM" |
| 6 | BFO/OFF Switch | "OFF" |
| 7 | VAR/OFF Control | Fully ccw, detent "OFF" |
| 8 | 1 kHz/OFF Control | Fully ccw, detent "OFF" |
| 9 | MODULATION FREQ Hz Thumbwheels | "01000.0" |
| 10 | DEV-VERT Control | ".01 V/DIV" |
| 11 | DEV-VERT Vernier Control | Fully cw, in detent |
| 12 | AC/OFF/DC Switch | "AC" |
| 13 | SWEEP Control | ".01" |
| 14 | SWEEP Vernier Control | Fully cw, in detent |
| 15 | INTENSITY Control | Midrange |
| 16 | FOCUS Control | Midrange |
| 17 | VERT Control | Midrange |
| 18 | ANALY DISPR Control | Fully cw, in detent |
| 19 | HORIZ Control | Midrange |
| 20 | DEV PWR Control | "2 kHz" |
| 21 | HI LVL/µV X 100/NORM Switch | "µV X 100" |
| 22 | BFO-RF LEVEL Control | "-80 dBm" |
| 23 | AUTO ZERO/OFF/BATT Switch | "AUTO ZERO" |
| 24 | Probe Range Switch | "X1" |

Table 2-6 Signal Generator Operational Check (Continued)

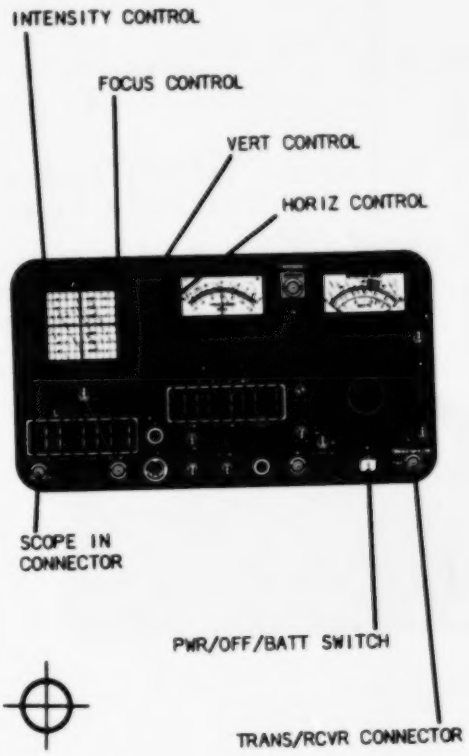
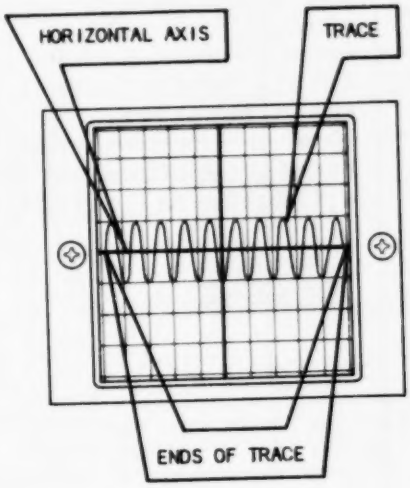
| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 1 | Connect probe between SCOPE IN and TRANS/RCVR Connectors. |   |
| 2 | Set PWR/OFF/BATT Switch in either "PWR" or "BATT" position. Allow trace on CRT to become visible. | |
| 3 | Adjust INTENSITY Control until trace contrast is distinct. | |
| 4 | Adjust FOCUS Control until trace is sharply defined. | |
| 5 | Adjust VERT Control to center trace over horizontal axis of CRT display. | |
| 6 | Adjust HORIZ Control to center trace between outer edges of CRT. |   |

Table 2-6 Signal Generator Operational Check (Continued)

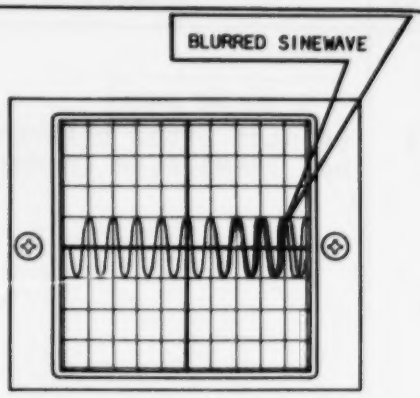
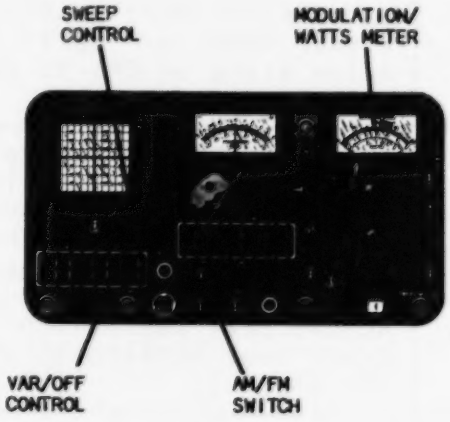
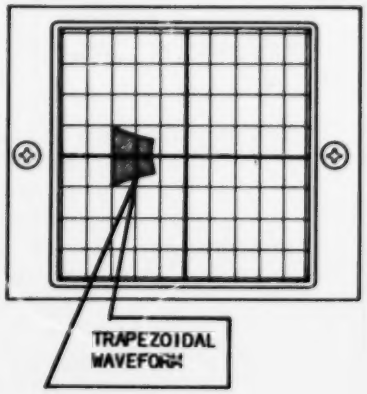
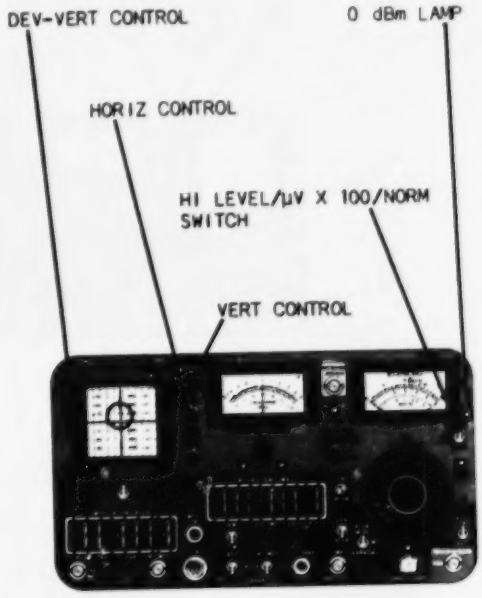
| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 7 | Adjust VAR/OFF Control until DEVIATION/WATTS Meter displays 2 kHz. |   |
| 8 | Verify the sinewave on CRT becomes slightly blurred near the right side. | |
| 9 | Set AM/FM Switch in "AM" position. |   |
| 10 | Rotate SWEEP Control to "MOD FREQ" position. | |
| 11 | Verify waveform on CRT is now a trapezoidal display. |   |

Table 2-6. Signal Generator Operational Check - Continued

| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 12 | Set AM/FM Switch in "FM" position. | |
| 13 | Rotate BFO-RF LEVEL Control to 1000 µV. | |
| 14 | Adjust VERT Control so bottom of display on CRT touches the horizontal axis. | |
| 15 | Adjust HORIZ Control to center CRT display over the vertical axis. | |
| 16 | Note the amplitude of the CRT display. It should be higher than two minor divisions above the horizontal axis but below the first major horizontal division. | |
| 17 | Rotate BFO-RF LEVEL Control fully ccw. | |
| 18 | Rotate DEV-VERT Control to "1 V/DIV" position. | |
| 19 | Set HI LVL/µV X 100/NORM Switch in "HI LVL" position. | |
| 20 | Rotate BFO-RF LEVEL Control cw until 0 dBm Lamp illuminates. | |
| 21 | Adjust VERT Control so bottom of CRT display touches the horizontal axis. | |
| 22 | Adjust HORIZ Control to center CRT display over the vertical axis. | |
| 23 | Note the amplitude of the CRT display. It should at least reach the first major division, but should not exceed 2.5 minor divisions above the first major horizontal division. | |



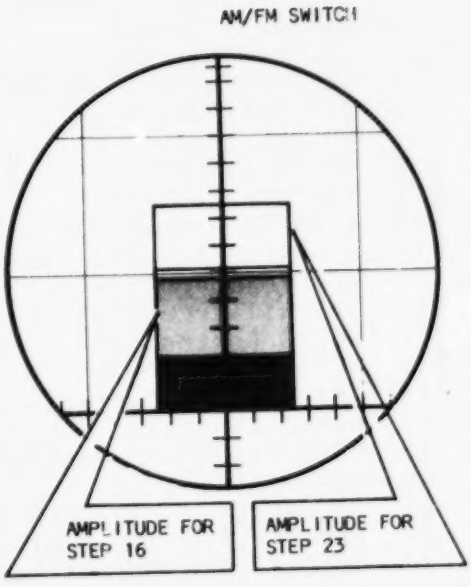
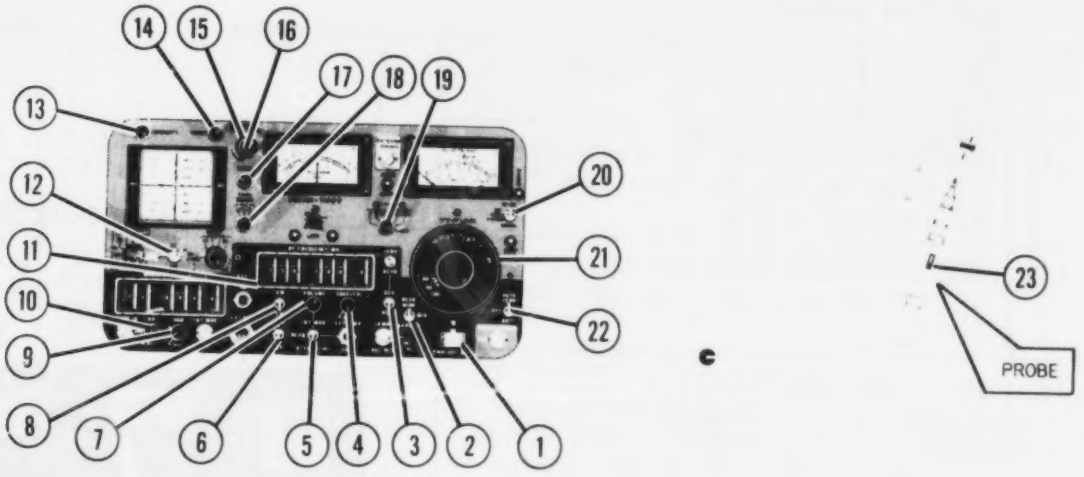



Table 2-7. Receiver Operational Check

INITIAL CONTROL SETTINGS




| KEY | CONTROL | INITIAL SETTING |
|---|---|---|
| 1 | PWR/OFF/BATT Switch | "OFF" |
| 2 | RCVR WIDE/MID/NARROW Switch | "NARROW" |
| 3 | GEN/RCVR Switch | "RCVR" |
| 4 | SQUELCH Control | Fully ccw, out of detent |
| 5 | INT MOD/RCVR/RCVR (DET OFF) Switch | "RCVR" |
| 6 | BFO/OFF Switch | "OFF" |
| 7 | VOLUME Control | Fully ccw |
| 8 | AM/FM Switch | "AM" |
| 9 | VAR/OFF Control | Fully ccw, in detent |
| 10 | 1 kHz/OFF Control | Fully ccw, in detent |
| 11 | RF FREQUENCY MHz Thumbwheels | "010 000 0" |
| 12 | AC/OFF/DC Switch | "DC" |
| 13 | INTENSITY Control | Midrange |
| 14 | FOCUS Control | Midrange |
| 15 | VERT Control | Midrange |
| 16 | ANALY DISPR Control | Fully ccw, out of detent |
| 17 | HORIZ Control | Midrange |
| 18 | FREQ ERROR kHz Control | "1.5 kHz" |
| 19 | DEV PWR Control | "SIG" |
| 20 | HI LVL/µV X 100/NORM Switch | "NORM" |
| 21 | BFO-RF LEVEL Control | Fully ccw |
| 22 | AUTO ZERO/OFF/BATT Switch | "AUTO ZERO" |
| 23 | Probe Range Switch | "X1" |

Table 2-7. Receiver Operational Check– Continued

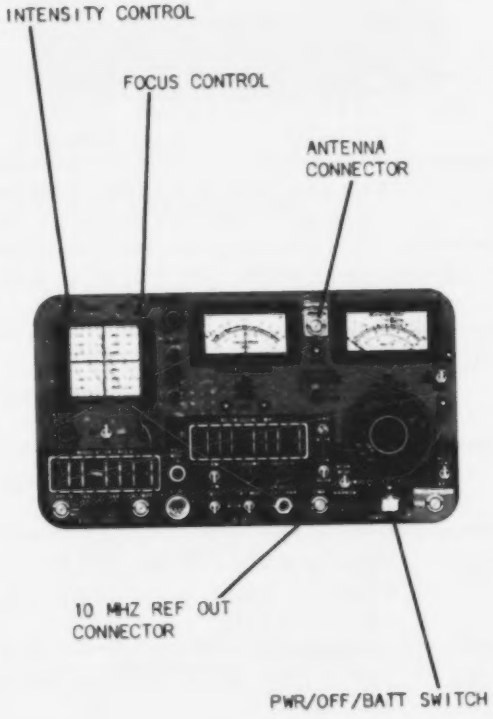
| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 1 | Set PWR/OFF/BATT Switch in either "PWR" or "BATT" position. Allow 30 seconds for warm up from a cold start for trace on CRT to become visible. |   |
| 2 | Adjust INTENSITY Control until trace contrast is distinct. | |
| 3 | Adjust FOCUS Control until trace is sharply defined. | |
| 4 | Connect 10, 20, and 30 dB Attenuator Pads in series to 10 MHz REF OUT connector. | |
| 5 | Using Probe BNC Adapter, connect Probe between Attenuator Pads and Antenna Connector. | |

Table 2-7. Receiver Operational Check—Continued

| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 6 | Read FREQ ERROR Meter. Needle should show -50 Hz to +50 Hz. | |
| 7 | Rotate RF FREQUENCY MHz Thumbwheels to "010 001 0". | |
| 8 | Read the FREQ ERROR Meter. Needle should show -.9 kHz to -1.1 kHz. | |
| 9 | Rotate RF FREQUENCY MHz Thumbwheels to "009 999 0". | |
| 10 | Read FREQ ERROR Meter. Needle should show +.9 kHz to +1.1 kHz. | |
| 11 | Rotate FREQ ERROR Control to "5 kHz" position. | |
| 12 | Rotate RF FREQUENCY MHz Thumbwheels to "009 996 0". | |
| 13 | Read FREQ ERROR Meter. Needle should show +3.7 kHz to +4.3 kHz. | |
| 14 | Rotate RF FREQUENCY MHz Thumbwheels to "010 004 0". | |
| 15 | Read FREQ ERROR Meter. Needle should show -3.7 kHz to -4.3 kHz. | |
| 16 | Set RCVR WIDE/MID/NARROW Switch in "WIDE" position. | |
| 17 | Rotate FREQ ERROR Control to "15 kHz" position. | |
| 18 | Rotate RF FREQUENCY MHz Thumbwheels to "010 010 0". | |
| 19 | Read FREQ ERROR Meter. Needle should show -9 kHz to -11 kHz. | |
| 20 | Rotate RF FREQUENCY MHz Thumbwheels to "009 990 0". | |
| 21 | Read FREQ ERROR Meter. Needle should show +9 kHz to +11 kHz. | |

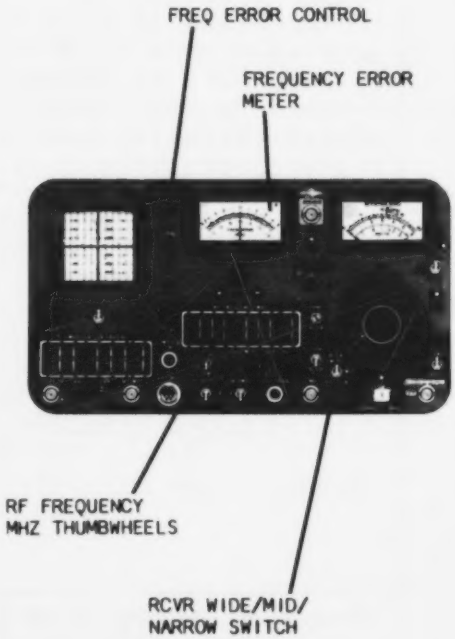
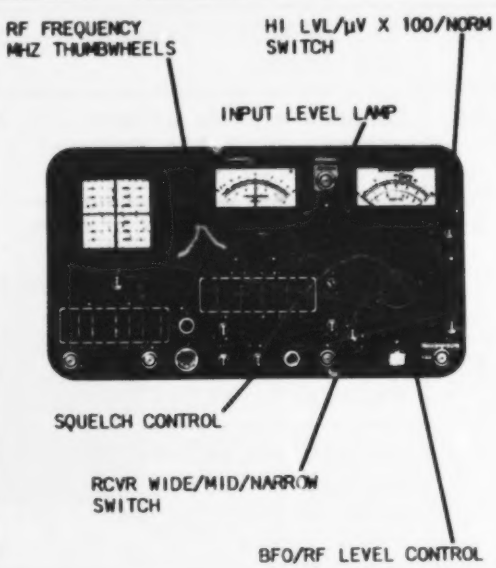
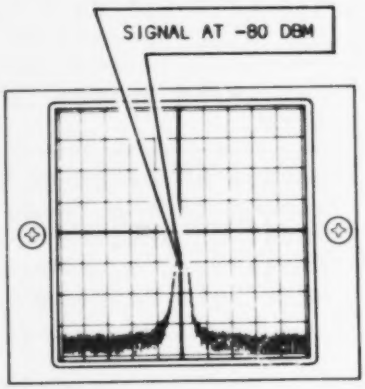


Table 2-7. Receiver Operational Check – Continued

| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 22 | Disconnect probe from ANTENNA Connector. | |
| 23 | Rotate RF FREQUENCY MHz Thumbwheels to "120 200 0". | |
| 24 | Set BFO/OFF Switch in "BFO" position. | |
| 25 | Rotate BFO-RF LEVEL Control cw until INPUT LEVEL Lamp illuminates. Dial should show between 5 µV and 3 µV. | |
| 26 | Rotate SQUELCH Control fully cw. Verify INPUT LEVEL Lamp goes out. | |
| 27 | Rotate SQUELCH Control fully ccw just out of detent. | |
| 28 | Set RCVR WIDE/MID/NARROW Switch in "NARROW" position. | |
| 29 | Rotate BFO-RF LEVEL Control fully ccw. | |
| 30 | Rotate BFO-RF LEVEL Control cw until INPUT LEVEL Lamp again illuminates. Dial should show between 0.2 µV and 2.0 µV. | |
| 31 | Rotate BFO-RF LEVEL Control to "-80 dBm" position. CRT display should be between -71 dBm and -89 dBm in amplitude. | |
| 32 | Set HI LVL/µV X 100/NORM Switch in "µV X 100" position. CRT display should be between -31 dBm and -49 dBm. | |



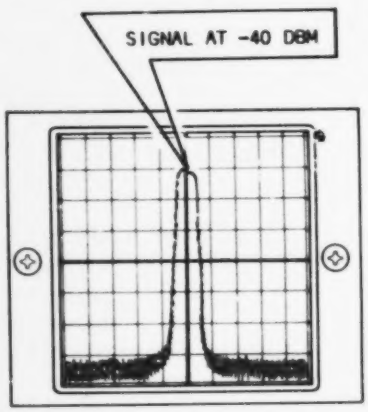



Table 2-7. Receiver Operational Check —Continued

| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 33 | Set BFO/OFF Switch in "OFF" position. | |
| 34 | Connect outside antenna (or accessory antenna if within range of a station) to ANTENNA connector. | |
| 35 | Rotate RF FREQUENCY MHz Thumbwheels to the frequency of a local or AFRS AM broadcast station. | |
| 36 | Set INT MOD/RCVR/RCVR (DET OFF) Switch in "RCVR" position. | |
| 37 | Adjust VOLUME Control for a comfortable listening level. You should clearly hear the broadcast signal. | |
| 38 | Set RCVR WIDE/MID/NARROW Switch in "WIDE" position. | |
| 39 | Set AM/FM Switch in "FM" position. | |
| 40 | Rotate RF FREQUENCY MHz Thumbwheels to the frequency of a local or AFRS FM broadcast station. You should clearly hear this broadcast signal. | |

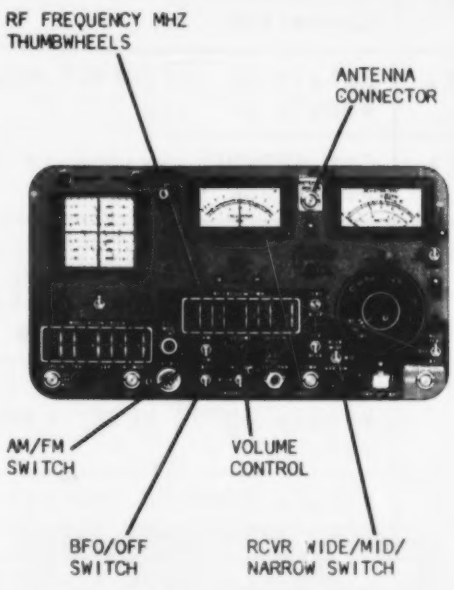
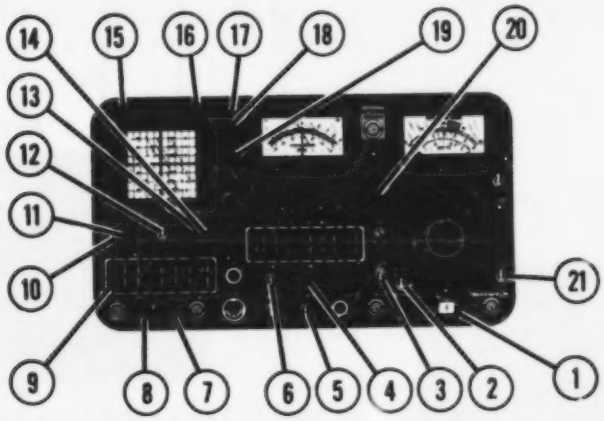


Table 2-8 Deviation Meter Operational Check

INITIAL CONTROL SETTINGS




| KEY | CONTROL | INITIAL SETTING |
|---|---|---|
| 1 | PWR/OFF/BATT Switch | "OFF" |
| 2 | RCVR WIDE/MID/NARROW Switch | "NARROW" |
| 3 | GEN/RCVR Switch | "GEN" |
| 4 | VOLUME Control | Fully ccw |
| 5 | INT MOD/RCVR/RCVR (DET OFF) Switch | "INT MOD" |
| 6 | AM/FM Switch | "FM" |
| 7 | VAR/OFF Control | Fully ccw, detent "OFF" |
| 8 | 1 kHz/OFF Control | Fully ccw, detent "OFF" |
| 9 | MODULATION FREQ Hz Thumbwheels | "01000.0" |
| 10 | DEV-VERT Control | "1.5 kHz" |
| 11 | DEV-VERT Vernier Control | Fully cw, in detent |
| 12 | AC/OFF/DC Switch | "DC" |
| 13 | SWEEP Control | "1" |
| 14 | SWEEP VERNIER Control | Fully cw, in detent |
| 15 | INTENSITY Control | Midrange |
| 16 | FOCUS Control | Midrange |
| 17 | VERT Control | Midrange |
| 18 | ANALY DISPR Control | Fully ccw, in detent |
| 19 | HORIZ Control | Midrange |
| 20 | DEV PWR Control | "2 kHz" |
| 21 | AUTO ZERO/OFF/BATT Switch | "AUTO ZERO" |

Table 2-8 Deviation Meter Operational Check (Continued)

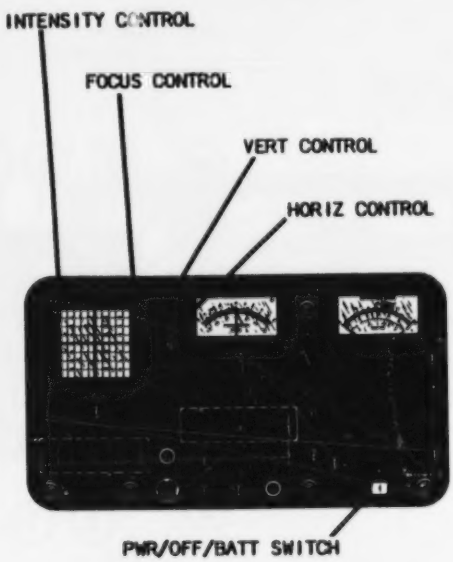
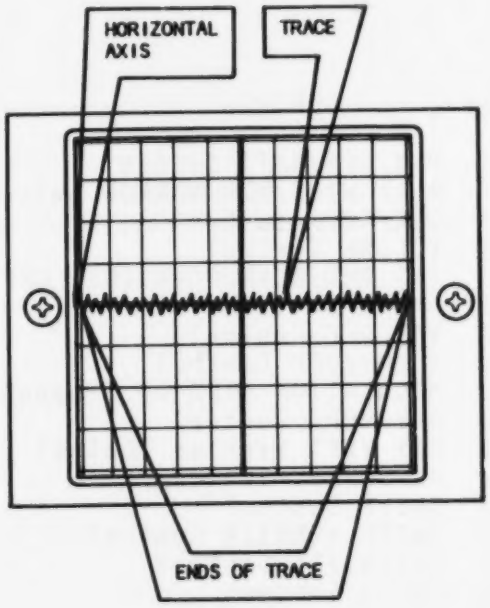
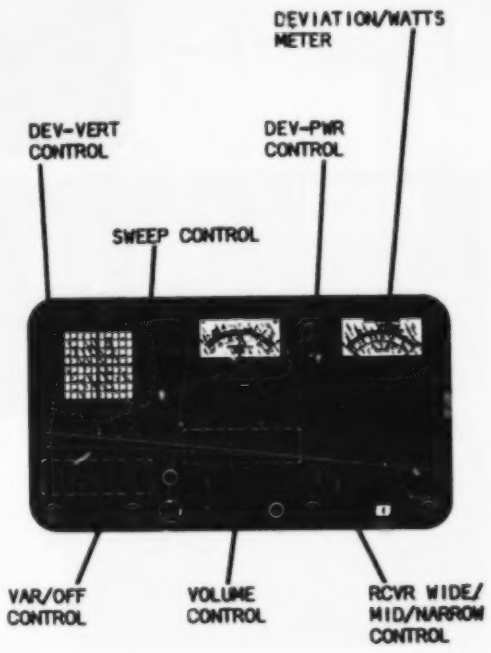
| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 1 | Set PWR/OFF/BATT Switch in either "PWR" or "BATT" position. Allow trace on CRT to become visible. |   |
| 2 | Adjust INTENSITY Control until trace contrast is distinct. | |
| 3 | Adjust FOCUS Control until trace is sharply defined. | |
| 4 | Adjust VERT Control to center trace over horizontal axis of CRT display. | |
| 5 | Adjust HORIZ Control to center trace between outer edges of CRT. |   |

Table 2-8 Deviation Meter Operational Check (Continued)

| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 6 | Adjust VAR/OFF Control cw until DEVIATION/WATTS Meter indicates 1.5 kHz. Sinewave displayed on CRT should be between 5.5 and 6.5 major horizontal divisions peak-to-peak. | |
| 7 | Rotate DEV-PWR Control to "6 kHz" position. | |
| 8 | Rotate DEV-VERT Control to "6 kHz" position. | |
| 9 | Adjust VAR/OFF Control cw until DEVIATION/WATTS Meter indicates 6 kHz. Sinewave displayed on CRT should be between 5.5 and 6.5 major horizontal divisions peak-to-peak. | |
| 10 | Rotate SWEEP Control to 0.1 mS position. Sinewave should be free from any significant distortion. | |
| 11 | Set RCVR WIDE/MID/NARROW Switch in "MID" position. | |
| 12 | Rotate DEV-PWR Control to "20 kHz" position. | |
| 13 | Rotate DEV-VERT Control to "15 kHz" position. | |
| 14 | Adjust VAR/OFF Control cw until DEVIATION/WATTS Meter indicates 15 kHz. Sinewave displayed on CRT should be between 5.5 and 6.5 major horizontal divisions peak-to-peak. | |
| 15 | Adjust VOLUME Control for a comfortable listening level. You should hear an audio tone. | |



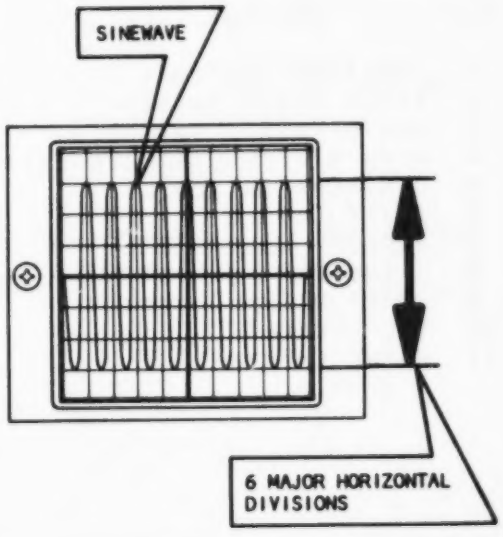
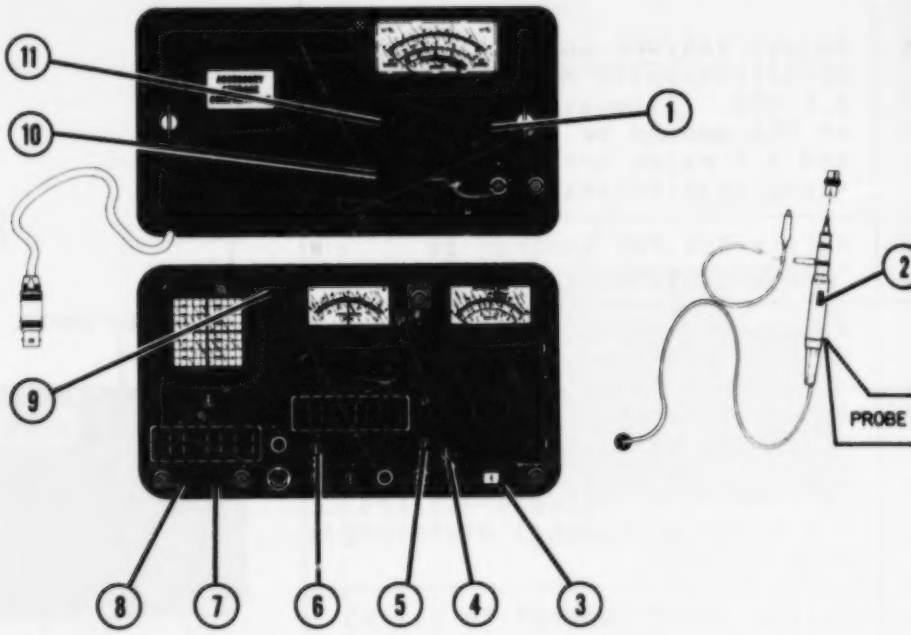



Table 2-9 MM-100E Audio Volume, AC Voltmeter, Ohmmeter and AM% Modulation Meter Operational Check

INITIAL CONTROL SETTINGS




| KEY | CONTROL | INITIAL SETTING |
|---|---|---|
| 1 | FUNCTION Control | "HI-Z" |
| 2 | Probe Range Switch | "X1" |
| 3 | PWR/OFF/BATT Switch | "OFF" |
| 4 | RCVR WIDE/MID/NARROW Switch | "MID" |
| 5 | GEN/RCVR Switch | "GEN" |
| 6 | AM/FM Switch | "AM" |
| 7 | VAR/OFF Control | Fully ccw, detent "OFF" |
| 8 | 1 kHz/OFF Control | Fully ccw, detent "OFF" |
| 9 | ANALY DISPR Control | Fully ccw, detent "OFF" |
| 10 | VOL Control | Midrange |
| 11 | RANGE Control | "10 V" |

Table 2-9 MM-100E Audio Volume, AC Voltmeter, Ohmmeter, and AM% Modulation Meter Operational Check (Continued)

| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 1 | Couple Interconnect Power Connector to EXT ACC Connector. | |
| 2 | Connect Probe BNC Connector to MM-100E INPUT Connector. | |
| 3 | Using Probe BNC Adapter, connect Probe to FM/AM-1100S INT MOD OUT Connector. | |
| 4 | Set PWR/OFF/BATT Swtich in "PWR" or "BATT" position. | |
| 5 | Rotate 1 kHz/OFF Control smoothly to maximum cw. Tone from MM-100E speaker should become audible and increase in volume with rotation of 1 kHz/OFF Control. | |
| 6 | Smoothly rotate MM-100E VOL Control fully ccw. Tone from MM-100E speaker should decrease in volume and become inaudible at full ccw travel. | |
| 7 | Observe MM-100E Meter. Needle should deflect smoothly as 1 kHz/OFF Control is rotated fully ccw and cw, meter should show between 2.5 and 4.5 VRMS on V/% (0-10) scale. | |
| 8 | Rotate RANGE Control to "AM %" position. | |
| 9 | Rotate 1 kHz/OFF Control ccw and cw. MM-100E Meter needle should follow rotation of control. | |

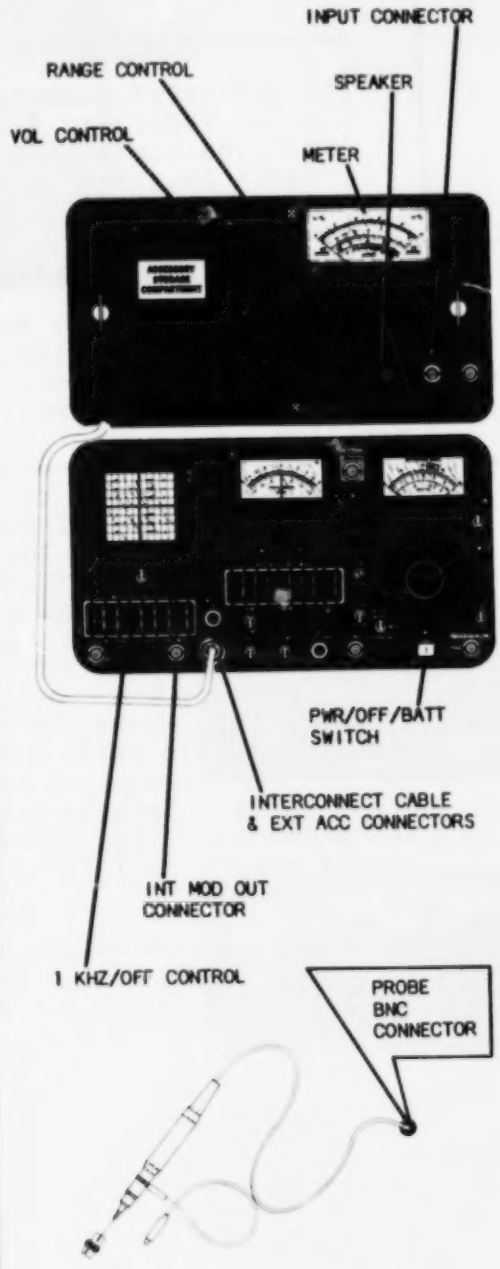


Table 2-9 MM-100E Audio Volume, AC Voltmeter, Ohmmeter and AM% Modulation Meter Operational Check (Continued)

| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| | **CAUTION**<br>DO NOT APPLY A VOLTAGE TO THE PROBE TIP WITH FUNCTION CONTROL IN "OHMS" POSITON. DOING SO WILL BLOW THE FUSE IN THE MM-100E. | |
| 10 | Remove Probe from INT MOD OUT Connector on FM/AM-1100S. | |
| 11 | Rotate FUNCTION Control to "OHMS" position. | |
| 12 | Rotate RANGE Control to "X1Ω" position. Ohmmeter should show infinity ("∞") on MM-100E. | |
| 13 | Attach probe grounding clip to probe tip. Ohmmeter should show "0". | |
| 14 | Rotate RANGE Control to "X10KΩ". Ohmmeter should still show "0". | |
| 15 | Break contact between probe tip and grounding clip. Ohmmeter should return to infinity ("∞"). | |

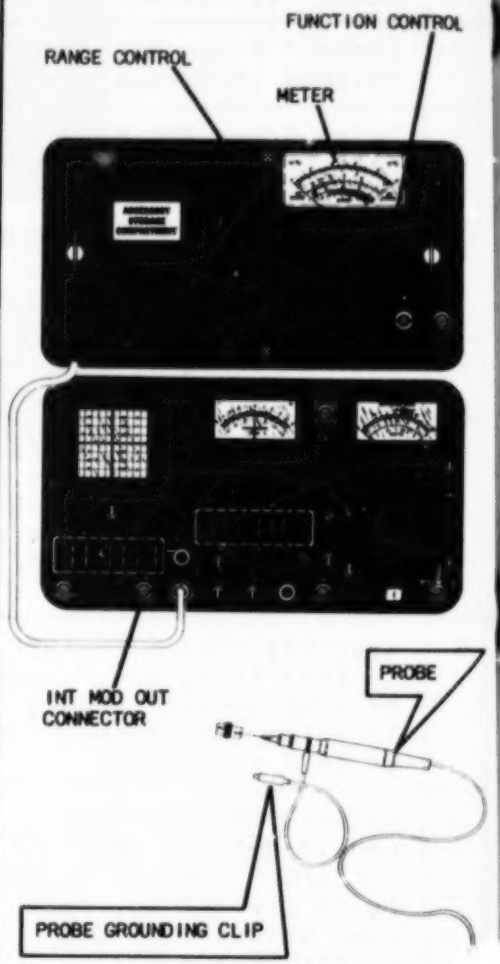
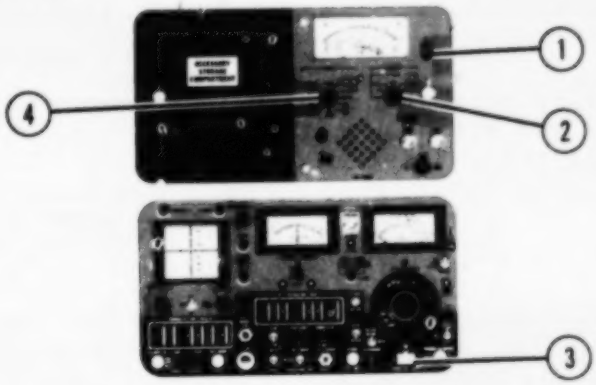


Table 2-10, MM-100E DC Voltmeter Operational Check

INITIAL CONTROL SETTINGS




| KEY | CONTROL | INITIAL SETTING |
|---|---|---|
| 1 | DC ZERO OFFSET Control | Fully ccw, in detent |
| 2 | FUNCTION Control | "+DC" |
| 3 | PWR/OFF/BATT Switch | "OFF" |
| 4 | RANGE Control | "30 V" |

| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 1 | Couple Interconnect Power Connector to EXT ACC Connector. | |
| 2 | Connect Probe BNC Connector to MM-100E INPUT Connector. | |

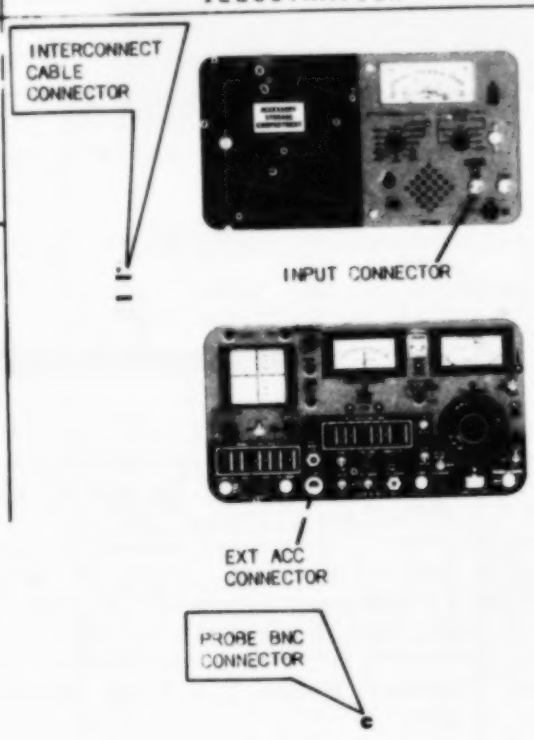


Table 2-10. MM-100E DC Voltmeter Operational Check- Continued

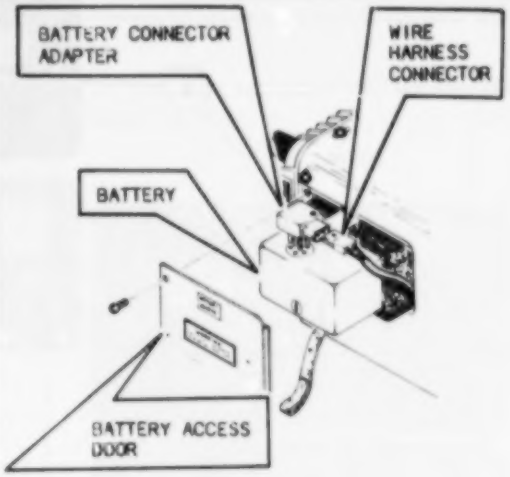
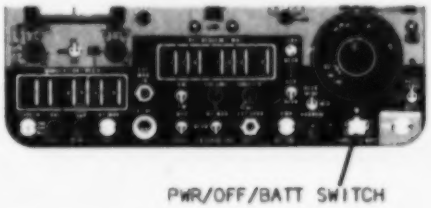
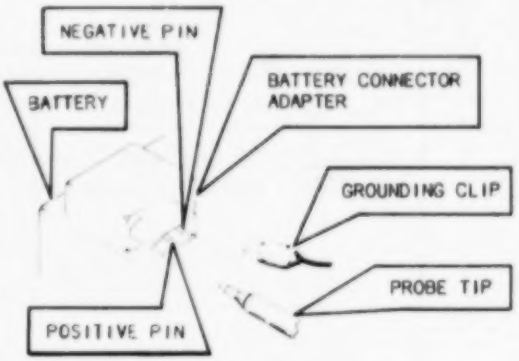
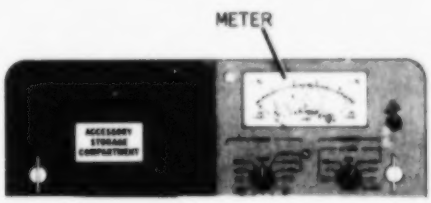
| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 3 | Remove battery access door on FM/AM-1100S and withdraw battery approximately three inches. |  |
| 4 | Disconnect battery wire harness connector from battery connector adapter. Leave the battery connector adapter plugged into the battery. | |
| 5 | Set PWR/OFF/BATT Switch in "PWR" position. |  |
| 6 | Connect probe grounding clip to negative pin of battery connector.<br>**CAUTION**<br>DO NOT SHORT CIRCUIT THE TWO BATTERY TERMINALS. |  |
| 7 | Touch probe tip to positive pin of battery connector. | |
| 8 | Read V/% (0-3) scale of MM-100E Voltmeter. Needle should show between 11 and 15 volts. |  |
| 9 | Remove probe tip from connector pin. | |

Table 2-10 MM-100E DC Voltmeter Operational Check (Continued)

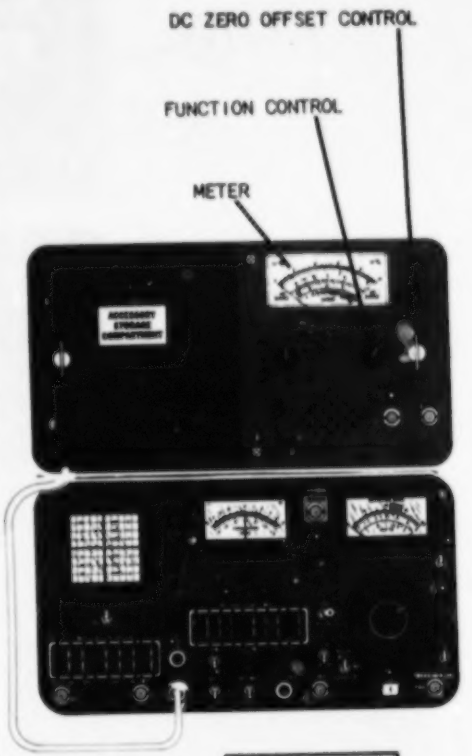
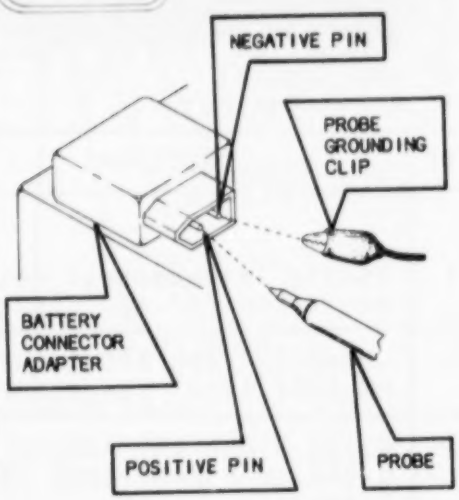
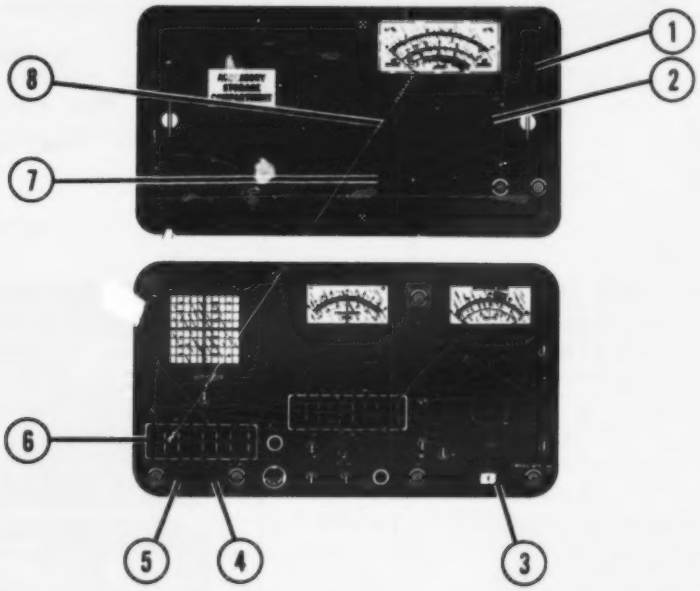
| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 10 | Rotate DC ZERO OFFSET Control cw to adjust needle of meter to 1.5 on 0-3 scale. |   |
| 11 | Touch probe tip to positive pin of battery connector. | |
| 12 | Meter needle should deflect to read between 26 and 30.5 volts on 0-3 scale. | |
| 13 | Rotate FUNCTION Control to "-DC". | |
| 14 | Rotate DC ZERO OFFSET Control to adjust needle to 1.5 on 0-3 scale. | |
| 15 | Touch probe tip to positive pin of battery connector. | |
| 16 | Meter needle should deflect to read between .5 and 4.0 volts on 0-3 scale. |   |
| 17 | Reconnect battery connector and stow battery in compartment. | |
| 18 | Replace battery access door. | |

Table 2-11 MM-100E Distortion Analyzer Operational Check

INITIAL CONTROL SETTINGS




| KEY | CONTROL | INITIAL SETTING |
|---|---|---|
| 1 | DC ZERO OFFSET Control | Fully ccw, in detent |
| 2 | FUNCTION Control | "HI-Z" |
| 3 | PWR/OFF/BATT Switch | "OFF" |
| 4 | VAR/OFF Control | Fully ccw, detent "OFF" |
| 5 | 1 kHz/OFF Control | Fully ccw, detent "OFF" |
| 6 | MODULATION FREQ Hz Thumbwheels | "01100.0" |
| 7 | VOL Control | Fully ccw |
| 8 | RANGE Control | ".1 V" |

| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 1 | Couple Interconnect Power Connector to EXT ACC Connector. | SEE ILLUSTRATION ON FOLLOWING PAGE FOR LOCATION OF CONTROLS AND CONNECTORS |
| 2 | Connect Probe BNC Connector to MM-100E INPUT Connector. | |
| 3 | Using Probe BNC Adaptor, connect probe to FM/AM-1100S INT MOD OUT Connector. | |

Table 2-11 MM-100E Distortion Analyzer Operational Check (Continued)

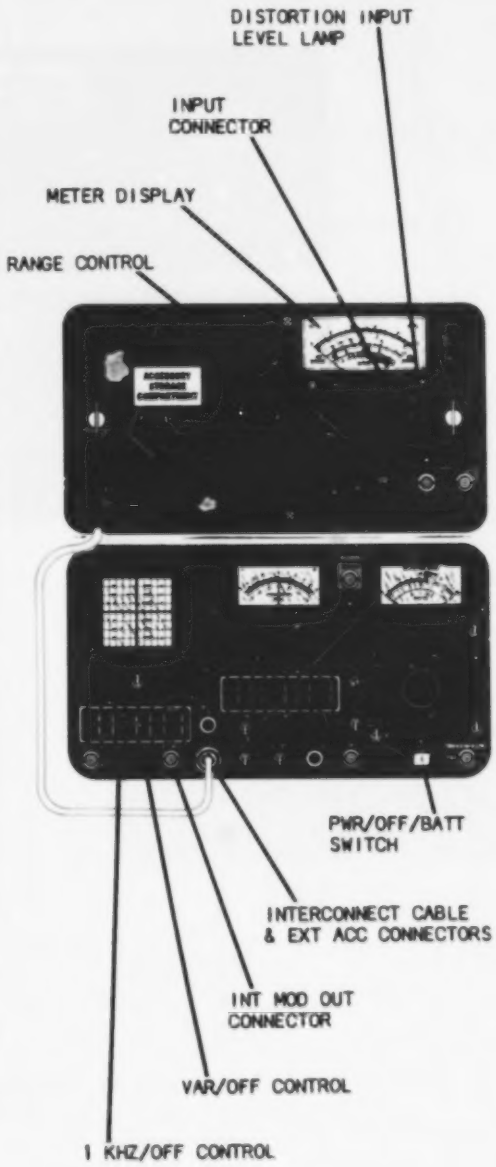
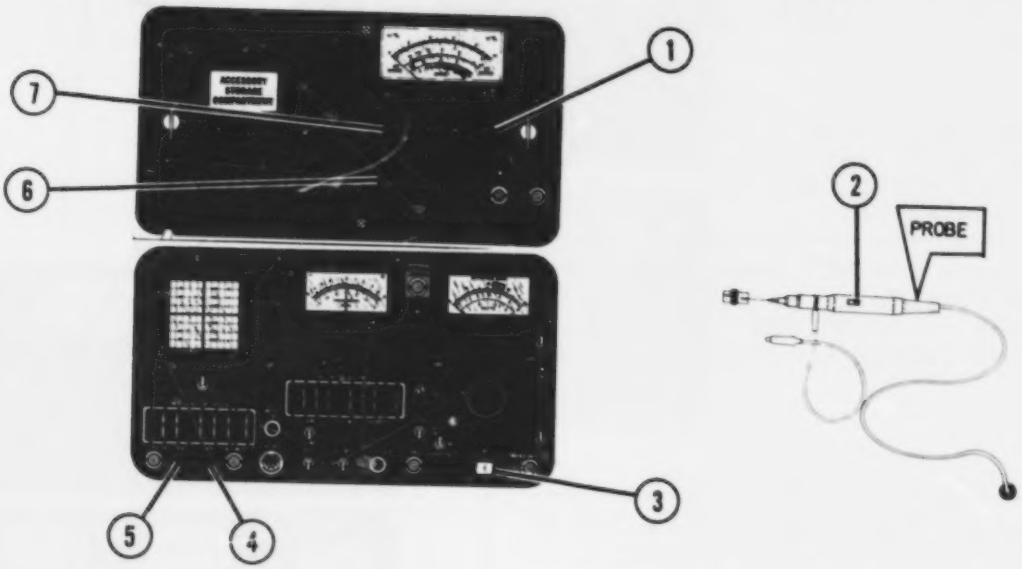
| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 4 | Set PWR/OFF/BATT Switch in "PWR" or "BATT" position. DISTORTION INPUT LEVEL Lamp should not be illuminated. |  |
| 5 | Rotate VAR/OFF Control cw until MM-100E Méter indicates 0.02 VRMS. DISTORTION INPUT LEVEL Lamp should be illuminated. | |
| 6 | Rotate RANGE Control to "10 V" position. | |
| 7 | Rotate VAR/OFF Control fully cw. | |
| 8 | Read and record voltage shown on MM-100E Meter. | |
| 9 | Rotate VAR/OFF Control fully ccw, detent "OFF". | |
| 10 | Rotate 1 kHz/OFF Control cw until MM-100E Meter indicates one-tenth of the reading recorded above. | |
| 11 | Rotate RANGE Control to "0-30% DIST". | |
| 12 | Rotate VAR/OFF Control fully cw. MM-100E Meter should indicate between 8.5% and 11.5% on V% 0-3 scale. | |

Table 2-12 MM-100E Range/Scale Consistency Operational Check (Input Attenuator Circuit)

INITIAL CONTROL SETTINGS




| KEY | CONTROL | INITIAL SETTING |
|---|---|---|
| 1 | FUNCTION Control | "HI-Z" |
| 2 | Probe Range Switch | "X1" |
| 3 | PWR/OFF/BATT Switch | "OFF" |
| 4 | VAR/OFF Control | Fully ccw, detent "OFF" |
| 5 | 1 kHz/OFF Control | Fully ccw, detent "OFF" |
| 6 | VOL Control | Fully ccw |
| 7 | RANGE Control | ".1V" |

| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 1 | Couple Interconnect Power Connector to EXT ACC Connector. | SEE ILLUSTRATION ON FOLLOWING PAGE FOR LOCATION OF CONTROLS AND CONNECTORS |
| 2 | Connect Probe BNC Connector to MM-100E INPUT Connector. | |
| 3 | Using Probe BNC Adaptor, connect Probe to INT MOD OUT Connector. | |

Table 2-12 MM-100E Range/Scale Consistency Operational Check (Input Attenuator Circuit) (Continued)

| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 4 | Set PWR/OFF/BATT Switch in "PWR" or "BATT" position. | |
| 5 | Rotate 1 kHz/OFF Control cw until MM-100E Meter displays "10" on V/% (0-10) scale. | |
| 6 | Rotate RANGE Control to ".3V". Meter should read .85 to 1.15 on V/% (0-3) scale. | |
| 7 | Rotate 1 kHz/OFF Control cw until meter displays "3" on V/% (0-3) scale. | |
| 8 | Rotate RANGE Control to "1V". Meter should read 2.5 to 3.5 on V/% (0-10) scale. | |
| 9 | Rotate 1 kHz/OFF Control cw until meter displays "10" on V/% (0-10) scale. | |
| 10 | Rotate RANGE Control to "3V". Meter should read .85 to 1.15 on V/% (0-3) scale. | |
| 11 | Rotate 1 kHz/OFF Control cw until meter displays "3" on V/% (0-3) scale. | |
| 12 | Rotate RANGE Control to "10V". Meter should read 2.5 to 3.5 on V/% (0-10) scale. | |
| 13 | Rotate 1 kHz/OFF Control cw until meter displays "10" or maximum cw travel is reached. Record this reading. | |
| 14 | Rotate RANGE Control to "30V". On V/% (0-3) scale, meter should should not be more than .15 above or below 10% of the maximum reading attained and recorded above. | |

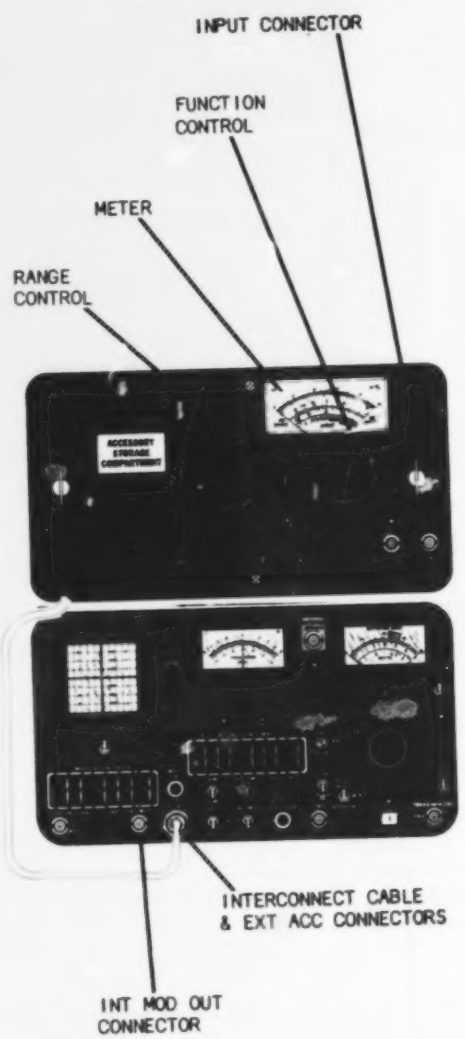
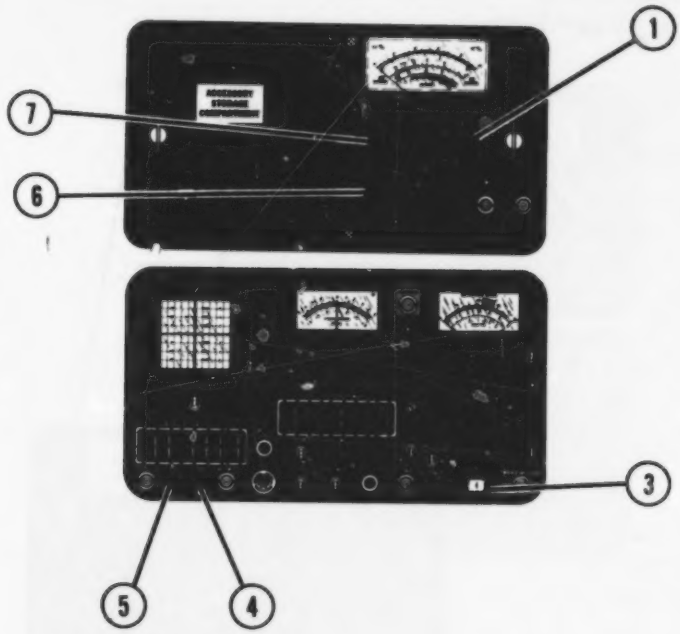
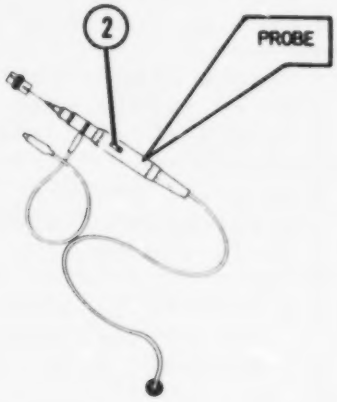


Table 2-13 MM-100E AC Load Operational Check

INITIAL CONTROL SETTINGS




| KEY | CONTROL | INITIAL SETTING |
|---|---|---|
| 1 | FUNCTION Control | "HI-Z" |
| 2 | Probe Range Switch | "X1" |
| 3 | PWR/OFF/BATT Switch | "OFF" |
| 4 | VAR/OFF Control | Fully ccw, detent "OFF" |
| 5 | 1 kHz/OFF Control | Fully ccw, detent "OFF" |
| 6 | VOL Control | Fully ccw |
| 7 | RANGE Control | "3 V" |

| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 1 | Couple Interconnect Power Connector to EXT ACC Connector. | SEE ILLUSTRATION ON FOLLOWING PAGE FOR LOCATION OF CONTROLS AND CONNECTORS |
| 2 | Connect Probe BNC Connector to MM-100E INPUT Connector. | |
| 3 | Using Probe BNC Adaptor, connect Probe to INT MOD OUT Connector. | |

Table 2-13 MM-100E AC Load Operational Check (Continued)

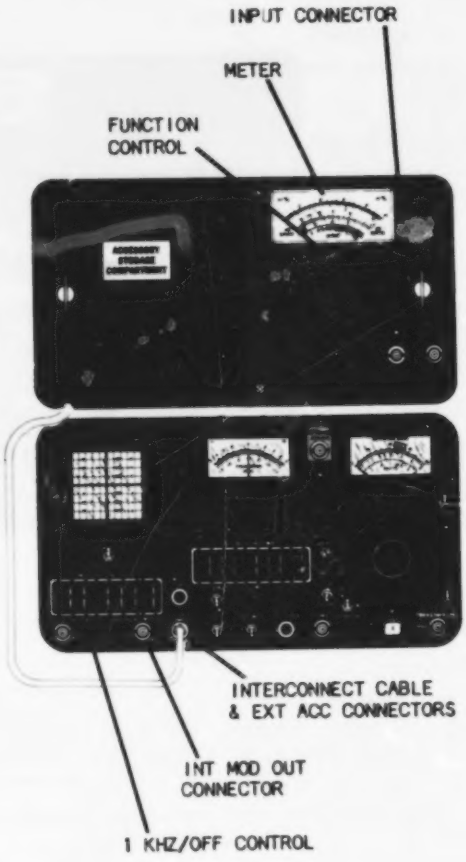
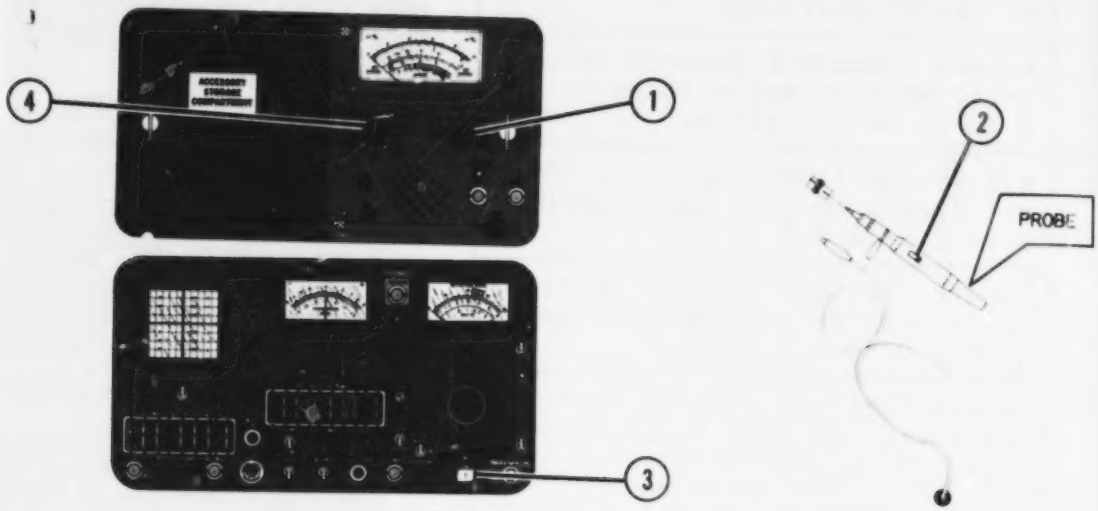
| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 4 | Set PWR/OFF/BATT Switch in "PWR" or "BATT" position. |  |
| 5 | Rotate 1 kHz/OFF Control cw until MM-100E Meter reads 3 Volts on 0-3 scale. | |
| 6 | Rotate FUNCTION Control to "600" position. MM-100E Meter should show 2.5 to 3.5 Volts. | |
| 7 | Rotate FUNCTION Control to "150" position. MM-100E Meter should show 2.0 to 2.5 Volts. | |
| 8 | Rotate FUNCTION Control to "8" position. MM-100E Meter should show .29 to .35 Volts. | |
| 9 | Rotate FUNCTION Control to "3.2" position. MM-100E Meter should show .11 to .13 Volts. | |

Table 2-14 Battery Connector Adapter Check

INITIAL CONTROL SETTINGS

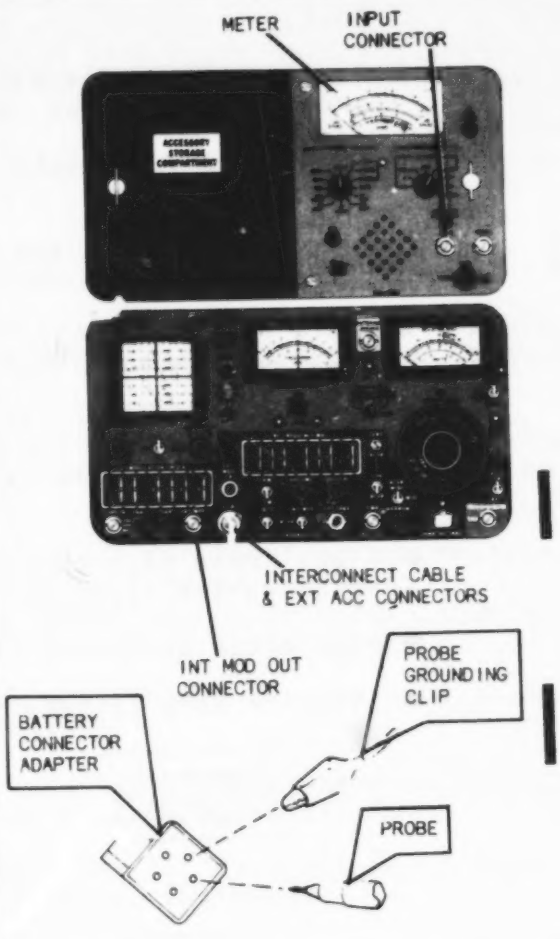



| KEY | CONTROL | INITIAL SETTING |
|---|---|---|
| 1 | FUNCTION Control | "OHMS" |
| 2 | Probe Range Switch | "X1" |
| 3 | PWR/OFF/BATT Switch | "OFF" |
| 4 | RANGE Control | "1Ω" |

| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 1 | Couple Interconnect Power Connector to EXT ACC Connector. | SEE ILLUSTRATION ON FOLLOWING PAGE FOR LOCATION OF CONTROLS AND CONNECTORS |
| 2 | Connect Probe BNC Connector to MM-100E INPUT Connector. | |
| 3 | Remove Battery Connector Adapter as described in paragraph 2-9. | |

Table 2-14. Battery Connector Adapter Check - Continued

| STEP | PROCEDURE | ILLUSTRATION |
|---|---|---|
| 4 | Set PWR/OFF/BATT Switch in "PWR" position. | |
| 5 | Connect probe grounding clip to battery connector adapter pin as shown. | |
| 6 | Touch probe tip to battery connector adapter pin as shown. MM-100E Meter should show 70 ohms or less on the Ohms scale. | |
| 7 | Reverse the grounding clip and probe tip connections. The MM-100E Meter should show ∞ on the Ohms scale. | |
| 8 | Replace the battery connector adapter as described in paragraph 2-10. | |




## Section VI, PREPARATION FOR STORAGE AND SHIPMENT

### 2-17. GENERAL.

When the AN/GRM-114A is shipped to another organization or will be stored for an extended time, it must be repackaged to prevent damage. Use the original shipping container and packing for this purpose.

**NOTE**

Refer to TM 740-90-1, Administrative Storage of Equipment, for general storage procedures.

## 2-18 PACKING FOR STOI AGE OR SHIPMENT (See Figure 2-6),

- Repair, clean and preserve AN/GRM-114A as directed in TM 740-90-1.
- Remove battery and battery connector adapter as described in paragraph 2-9, then replace battery access door.
- Stow battery connector adapter in lid of AN/GRM-114A and clos lid.
- Place AN/GRM-114A and manuals TM 11-6625-3016-10-1 and TM 11-6625-3016-20-1 in canvas carrying case.
- Place AN/GRM-114A in inner carton. Close carton flaps and seal with package sealing tape.
- Weatherproof inner carton as required by TM 740-90-1.
- Insert sealed inner carton, containing AN/GRM-114A, into outer carton.
- Place loose foam packing over top end of inner carton. Close outer carton flaps and seal with package sealing tape.
- Mark outer carton as required by TM 740-90-1.
- Store or ship battery separately as required by TM 740-90-1.

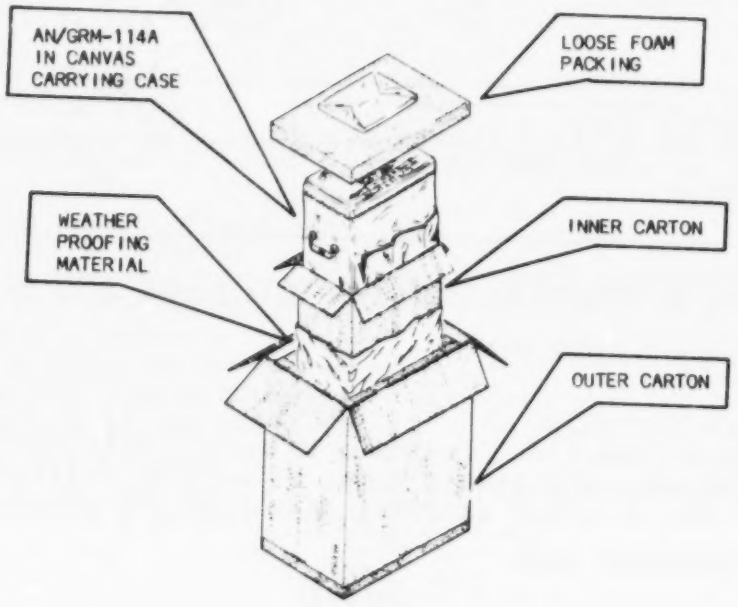



Figure 2-6. Packing the AN/GRM-114A.

# APPENDIX A

# REFERENCES

The following is a list of applicable references that are available to the organizational maintenance personnel for the AN/GRM-114A Radio Test Set.

| | |
|---|---|
| DA Pam 310-1 | Consolidated Index of Army Publications and Blank Forms. |
| DA Pam 738-750 | The Army Maintenance Management System (TAMMS). |
| SB 11-573 | Painting and Preservation of Supplies Available for Field Use for Electronics Command Equipment. |
| SB 38-100 | Preservation, Packaging, Packing and Marking Materials, Supplies and Equipment Used by the Army. |
| TB 43-0118 | Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters. |
| TB 43-180 | Calibration Requirements for the Maintenance of Army Material. |
| TB 43-180-1 | Calibration and Repair Requirements for the Maintenance of Army Material. |
| TB 385-4 | Safety Precautions for Maintenance of Electrical/Electronic Equipment. |
| TM 11-6625-3016-10-1 | Operator's Manual for Radio Test Set AN/GRM-114A (NSN 6625-01-144-4481). |
| TM 11-6625-3016-20-1 | Organizational Maintenance Manual for Radio Test Set AN/GRM-114A (NSN 6625-01-144-4481). |
| TM 740-90-1 | Administrative Storage of Equipment |
| TM 750-244-2 | Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command). |

# APPENDIX B

## MAINTENANCE ALLOCATION CHART

## Section 1, INTRODUCTION

### B-1. GENERAL

This maintenance allocation chart (MAC) for the AN/GRM-114A has been prepared in accordance with the requirements of DI-M-1510 with addendum I (EL) supplement 1, dated 17 October, 1978. The maintenance concept utilized herein is consistant with the direction provided by the government subsequent to analysis of the LSA GEMM data.

This appendix provides a summary of the maintenance operations for the AN/GRM-114A. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This MAC appendix may be used as an aid in planning maintenance operations.

### B-2. MAINTENANCE FUNCTIONS

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards through examination.

b. Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing these characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition such as to clean, to preserve, to paint and to lubricate.

d. Adjust. Maintain within prescribed limits by bringing into proper or exact position, or by setting the operation characteristics to the specified parameters.

e. Align. Maintain within prescribed limits by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

f. Calibrate. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, one which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.

g. Install. To set up for use in an operational environment such as an encampment, site or vehicle.

h. Replace. To replace unserviceable items with serviceable like items.

i. Repair. To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes, but is not limited to welding, grinding, riveting, straightening, and replacement of parts other than the trial and error replacement of running spare type items such as fuses and indicators.

j. Overhaul. Normally, the highest degree of maintenance performed by the Army in order to minimize time and assure that work in process is consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by maintenance standards in technical publications for each item to like new, zero mileage, or zero hour condition.

k. Rebuild. The highest degree of material maintenance. It consists of restoring equipment as nearly as possible to like-new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. Rebuild reduces to zero the hours the equipment, or component thereof, has been in use.

## B-3. EXPLANATION OF FORMAT OF SECTION II, MAINTENANCE ALLOCATION CHART

The columns in Section II are as follows:

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 lists the noun names of components, assemblies, subassemblies, and modules on which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a "worktime" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "worktime" figures will be shown for each category. The number of task-hours specified by the "worktime" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time and quality assurance/quality control time

in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart.

Subcolumns of column 4 are as follows:

| | |
|---|---|
| C Operator/crew | H General Support Maintenance |
| O Organizational | D Depot |
| F Direct Support | |

e. Column 5, Tools and Equipment. Column 5 specifies, by code, those tool sets and test equipment required to perform the designated function. The numbers appearing in this column refer to specific tools and test equipment which are identified in Section III.

f. Column 6, Remarks. Column 6 contains an alphabetical code which leads to the remark in Section IV, Remarks, which is pertinent to the item opposite the particular code.

## B-4. EXPLANATION OF FORMAT OF SECTION III, TOOL AND TEST EQUIPMENT REQUIREMENTS.

The columns in Section III are as follows:

a. Tools or Test Equipment Reference Code. The numbers in this column coincide with the numbers used in the Tools and Equipment column of the applicable tool or test equipment for the maintenance functions.

b. Maintenance Category. The codes in this column indicate the maintenance category normally allocated the tool or test equipment.

c. Nomenclature. This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

d. National/NATO Stock Number. This column lists the National/NATO stock number of the specific tool or test equipment.

e. Tool Number. This column lists the manufacturer's part number of the tool followed by the Federal Supply Code for Manufacturers (5 digit) in parentheses.

## B-5. EXPLANATION OF FORMAT OF SECTION IV, REMARKS.

The columns in Section IV are as follows:

a. Reference Code. This code refers to the appropriate item in Section II, Column 6.

b. Remarks. This column provides the required explanatory information necessary to clarify items appearing in Section II.

SECTION II MAINTENANCE ALLOCATION CHART
FOR

TEST SET, RADIO AN/GRM-114A

| (1) GROUP NUMBER | (2) COMPONENT/ASSEMBLY | (3) MAINTENANCE FUNCTION | (4) MAINTENANCE CATEGORY C | O | F | H | D | (5) TOOLS AND EQPT. | (6) REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 00 | TEST SET RADIO AN/GRM-114A (P/N 7002-2364-303) | INSPECT | | 0.2 | | | | | VISUAL |
| | | INSTALL | | 0.2 | | | | 21 | |
| | | REPLACE | | 0.2 | | | | 21 | |
| | | REPAIR | | 0.2 | | | | | L |
| | | TEST | | | | 4.0 | | 1-31 | |
| | | REPAIR | | | | 3.0 | | 1-31 | A-K,M |
| | | ALIGN | | | | 1.5 | | 1-31 | |
| 01 | COMPOSITE ASSEMBLY (P/N 7003-2364-102) | TEST | | | | 1.5 | | 1-12,14-30 | |
| | | REPAIR | | 0.2 | | | | 21 | L |
| 0101 | 120 MHz GENERATOR (P/N 7005-2385-500) | TEST | | | | 0.7 | | 17,18,20,21 | |
| | | REPLACE | | | | 0.3 | | 21 | |
| | | REPAIR | | | | 1.0 | | 1,2,6,7,8,9, 17-21 | |
| | | ALIGN | | | | 1.0 | | 1,17,18,21 | J |
| 0102 | 120 MHz RECEIVER (P/N 7027-2348-300) | TEST | | | | 1.5 | | 9,17,18,19, 20,21 | |
| | | REPLACE | | | | 0.3 | | 21 | |
| | | REPAIR | | | | 1.0 | | 1,2,5,9,11, 12,17,18,19, 20,21,28 | I |
| 0103 | DUAL TONE GENERATOR (P/N 7005-2385-700) | TEST | | | | 0.8 | | 3,5,6,9,17, 19,21 | |
| | | REPLACE | | | | 0.2 | | 21 | |
| | | REPAIR | | | | 1.5 | | 3,5,6,7,8,9, 11,12,17,18, 19,20,21,28 | |
| | | ALIGN | | | | 1.0 | | 3,9,17,21 | D |
| 0104 | 250 kHz IF MONITOR AUDIO (P/N 7010-2357-300) | TEST | | | | 1.5 | | 1,5,9,12,17, 19,21 | |
| | | REPLACE | | | | 0.2 | | 21 | |
| | | REPAIR | | | | 2.5 | | 1,2,5,9,12, 17,19,20,21, 30 | I |
| | | ALIGN | | | | 1.0 | | 1,5,12,17,21 | I |
| 0105 | FIRST MIXER (P/N 7005-2373-300) | TEST | | | | 0.5 | | 1,2,7,17,18, 21 | |
| | | REPLACE | | | | 0.3 | | 21 | J & I |
| | | REPAIR | | | | 1.0 | | 1,2,5,17,18, 20,21 | J & I |

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SECTION II MAINTENANCE ALLOCATION CHART
FOR

TEST SET, RADIO AN/GRM-114A

| (1) GROUP NUMBER | (2) COMPONENT/ASSEMBLY | (3) MAINTENANCE FUNCTION | (4) MAINTENANCE CATEGORY C | O | F | H | D | (5) TOOLS AND EQPT. | (6) REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0106 | SECOND MIXER (P/N 7017-2346-200) | TEST | | | | 0.7 | | 1,2,17,18, 20,21 | |
| | | REPLACE | | | | 0.3 | | 21 | J & I |
| | | REPAIR | | | | 1.0 | | 1,2,17,18, 20,21 | J & I |
| 0107 | POWER SUPPLY (P/N 7005-5045-701) | TEST | | | | 1.0 | | 5,17,21,23 | |
| | | REPLACE | | | | 0.5 | | 21,26,27 | B |
| | | REPAIR | | | | 1.5 | | 5,9,17,19, 20,21,23,26, 27 | B |
| | | ALIGN | | | | 1.0 | | 5,17,21,27 | B |
| 0108 | POWER TERMINATION (P/N 7005-2391-300) | TEST | | | | 0.5 | | 4,5,7,10,17, 20,21 | |
| | | REPLACE | | | | 0.5 | | 21 | C, J & I |
| | | REPAIR | | | | 1.0 | | 4,5,7,10,17, 18,20,21 | C, J & I |
| 0109 | HIGH FREQUENCY MULTI/MIXER (P/N 7015-2309-700) | TEST | | | | 0.8 | | 1,2,7,17,18, 21 | |
| | | REPLACE | | | | 0.4 | | 21 | F & G |
| | | REPAIR | | | | 1.5 | | 1,2,7,8,9, 11,12,17,18, 19,20,21,28 | F & G |
| 0110 | HIGH LEVEL AMPLIFIER (P/N 7005-2372-500) | TEST | | | | 1.0 | | 4,5,7,10,17, 21 | |
| | | REPLACE | | | | 0.5 | | 21 | |
| | | REPAIR | | | | 0.7 | | 4,5,7,9,10, 11,12,17-21, 28 | |
| 02 | FINAL ASSEMBLY MM-100E (P/N 7002-2389-100) | INSPECT | | | | 0.2 | | | VISUAL |
| | | REPAIR | | 0.2 | | | | 21 | L |
| | | ALIGN | | | | 1.0 | | 5,12,15,16, 17,21,31 | K |
| 0201 | COMPOSITE ASSEMBLY MM-100E (P/N 7003-2389-000) | TEST | | | | 1.5 | | 5,12,15,16, 17,21,22,23 | |
| | | REPLACE | | | | 0.2 | | 21 | K |
| | | REPAIR | | | | 1.0 | | 5,9,12,15, 16,17,19,20, 21,22,23 | |

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HISA-FM 586-77

SECTION II MAINTENANCE ALLOCATION CHART
FOR

TEST SET, RADIO AN/GRM-114A

| (1) GROUP NUMBER | (2) COMPONENT/ASSEMBLY | (3) MAINTENANCE FUNCTION | (4) MAINTENANCE CATEGORY C | O | F | H | D | (5) TOOLS AND EQPT. | (6) REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 03 | SPECTRUM ANALYZER (P/N 7029-2362-601) | INSPECT | | | | 0.2 | | | VISUAL |
| | | REPLACE | | | | 0.61 | | 21 | |
| | | REPAIR | | | | 0.3 | | 21 | N |
| | | ALIGN | | | | 0.23 | | 1,9,17,19, 20,21 | H |
| 0301 | SPECTRUM ANALYZER MODULE #1 (P/N 7055-2388-400) | TEST | | | | | | 3,5,9,17,18, 21 | |
| | | REPLACE | | | | 0.3 | | 21 | H |
| | | REPAIR | | | | 4.0 | | 3,5,6,9,17, 18,19,20,21 | H |

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HISA-FM 586-77

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS FOR

AN/GRM-114A

| TOOL OR TEST EQUIPMENT REF CODE | MAINTENANCE CATEGORY | NOMENCLATURE | NATIONAL/NATO STOCK NUMBER | TOOL NUMBER |
|---|---|---|---|---|
| 1 | H | Signal Generator, VHF HP 8640B/H66 | 4931-01-085-4229 | |
| 2 | H | Microwave Sweeper System W/E 4312A/K-16P<br>10-18 GHz W/E VM-4A | 6625-01-067-6018 | |
| 3 | H | Frequency Counter - EIP 351D | 4931-01-095-5457 | |
| 4 | H | Microwave Standards Kit - 50 Watt, 10-1 GHz<br>7915902 | 4931-00-152-1774 | |
| 5 | H | Digital Voltmeter - DM 501A | 6695-01-075-8583 | |
| 6 | H | Function Generator<br>TEK FG 502 or Wavetek 145 | 6695-01-074-7956<br>6625-01-083-1725 | |
| 7 | H | DC Power Supply - PS 503 | 6130-01-004-6705 | |
| 8 | H | DC Power Supply - CS 36CR3002 | 4931-00-962-2133 | |
| 9 | H | Oscilloscope TEK 5440<br>w/Plug-in TEK 5S14N<br>w/Plug-in TEK 5B42<br>w/Plug-in TEK 5A48 | 6625-01-034-3269<br>4931-01-008-1478<br>4931-01-008-1479<br>4931-01-008-1480 | |
| 10 | H | Power Meter HP 432A<br>w/Mount Therm HP8478B | 6625-00-436-4883<br>6625-00-811-2435 | |
| 11 | H | Distortion Analyzer HP C41-334A | 4931-00-987-9002 | |
| 12 | H | Modulation Meter HP 8901 | 6695-01-071-1720 | |
| 13 | H | High Voltage Probe 010-0277-00 | 6695-01-074-6072 | |
| 14 | H | Attenuator Variable HP 355C | 5985-00-763-7326 | |
| 15 | H | Resistor Decade WIN 336 (2 ea) | 6625-00-585-4915 | |
| 16 | H | Resistor Decade BG 71-631 | 6625-00-071-5343 | |
| 17 | H | Maintenance Group IFR P/N 7099-2389-500 | | |
| 18 | H | Spectrum Analyzer | 6625-00-228-7839 | |
| 19 | H | Probe Test 10:1 P6106 | 6625-01-112-5768 | |
| 20 | H | Digital Multimeter<br>Fluke 8020<br>(Part of JTK-17 Tool Kit) | | |

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SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR
AN/GRM-114A

| TOOL OR TEST EQUIPMENT REF CODE | MAINTENANCE CATEGORY | NOMENCLATURE | NATIONAL/NATO STOCK NUMBER | TOOL NUMBER |
|---|---|---|---|---|
| 21 | H | Tool Kit JTK-17 | 4931-00-073-3845 | |
| 22 | H | Test Set, AN/GRM-114A | 6625-01-144-4481 | |
| 23 | H | Isolation Transformer<br>Elgar Line Conditioner | 6110-00-309-2898 | |
| 24 | H | Stop Watch | | |
| 25 | H | 1' x 1' Rubber Mat | | |
| 26 | H | Power Supply Load Simulator<br>IFR-7099-2399-900 | | |
| 27 | H | Battery Load Simulator<br>IFR-7003-9801-600 | | |
| 28 | H | R.F. Probe<br>IFR-6500-9802-700 | | |
| 29 | H | Extender Board, Printed Circuit<br>Regulator/Timer<br>IFR-7010-9801-300 | | |
| 30 | H | Extender Board, Printed Circuit<br>250 kHz IF Monitor Audio<br>IFR-7010-9801-400 | | |
| 31 | H | Potentiometer, 1.0 K Ohm, 20%<br>1/4 Watt, 10 Turn | | |
| | | NOTE:<br>Above equipment can be found within Army Calibration System AN/GSM-287 | | |

SECTION IV. REMARKS

| REFERENCE CODE | REMARKS |
|---|---|
| A | Requires Calibration of the AN/GRM-114A |
| B | Requires Power Supply Alignment |
| C | Requires Regulator/Timer Alignment |
| D | Requires Dual Tone Generator Alignment |
| E | Requires TCXO Alignment |
| F | Requires VCO Tuner Alignment |
| G | Requires 1200-2200 MHz Oscillator Alignment |
| H | Requires Spectrum Analyzer Alignment |
| I | Requires 250 kHz IF Monitor Audio Alignment |
| J | Requires 120 MHz Generator Alignment |
| K | Requires MM-100E Alignment |
| L | Repair by replacement of handles, knobs and fuses |
| M | Printed Circuit Board/Modules not listed in MAC (23 ea) are deemed non-repairable and are to be discarded upon failure. |
| N | Repair by replacement or alignment of modules. |

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# APPENDIX C
# REPAIR PARTS AND SPECIAL TOOLS LIST

REFER TO TM 11-6625-3016-24P-1 FOR REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL)

# APPENDIX D
# EXPENDABLE SUPPLIES AND MATERIALS LIST
## Section I, INTRODUCTION

### D-1. SCOPE

This appendix lists expendable supplies and materials you will need to operate and maintain the Radio Test Set. These items are authorized to you by CTA 50-970, expendable items (Except Medical, Class V, Repair Parts and Heraldic Items).

### D-2. EXPLANATION OF COLUMNS

a. Column (1) - Item Number. No number appears in this column if the expendable item is referenced in the narrative by military specifications on other items. If the item is identified in the narrative instructions by an item number, this number will appear in this column.

b. Column (2) - Level. This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew

O - Organizational Maintenance

F - Direct Support Maintenance

H - General Support Maintenance

c. Column (3) - National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column (4) - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item gives the FSCM within the first parentheses and the part number within the second parentheses.

e. Column (5) - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g. EA, IN, PR). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

## Section II, EXPENDABLE SUPPLIES AND MATERIALS LIST

| (1) ITEM NUMBER | (2) LEVEL | (3) NATIONAL STOCK NUMBER | (4) DESCRIPTION FCSM and PART NUMBER | (5) UNIT OF MEASURE |
|---|---|---|---|---|
| | 0 | 8010-00-584-3157 | Paint Rubber, Olive Drab No. X20487 (81348) (MIL-F-014072) | PT |
| | 0 | 9150-00-159-4513 | Enamel, Semigloss Black (80244) (27038) | PT |
| | 0 | FED STD 595 | Enamel, Semigloss Gray (26440 ) | PT |
| | 0 | 6850-00-105-3084 | Trichlorotriflouroethane (Cleaning compound) (81349) (Type TF) | QT |
| | 0 | 8020-00-721-9657 | Brush, Paint, Flat 1½" wide (81348) (FED-SPEC H-B-451) | EA |
| | 0 | 5350-00-264-3485 | Paper, Abrasive, Flint, extra fine grade (81348) (FED-SPEC-PP-105) | RL |
| | 0 | 5350-00-145-0147 | Primer, 3 in chromate (81348) (FED-SPEC-TT-P-600) | PT |
| | 0 | | Soft lint-free cloth | RL |

# APPENDIX E

## LIST OF ABBREVIATIONS

The following abbreviations and symbols are commonly used throughout the TM 11-6625-3016-20-1, Organizational Maintenance Manual.

| | |
|---|---|
| A | - Ampere |
| AC | - Alternating Current |
| ACRC | - Area Calibration and Repair Center |
| AFRS | - Armed Forces Radio Station |
| AM | - Amplitude Modulation |
| Amp | - Amplifjer |
| BATT | - Battery |
| BFO | - Beat Frequency Oscillator |
| BNC | - Bayonet-Coupled Quick Disconnect (Industry standard coax connector) |
| CAL | - Calibrated |
| ccw | - counterclockwise |
| cw | - clockwise |
| CRT | - Cathode Ray Tube |
| CUT | - Circuit Under Test |
| dB | - decibels |
| dBm | - decibels per 1 milliwatt |
| DC | - Direct Current |
| EXT ACC | - External Accessory |
| EXT MOD | - External Modulation |
| EXT V/DIV | - External Volts per Division |
| FM | - Frequency Modulation |
| GEN | - Generator |
| HI LVL | - High Level |
| HORIZ | - Horizontal |
| Hz | - Hertz |
| IF | - Intermediate Frequency |
| INT MOD | - Internal Modulation |
| kHz | - kilohertz |
| MHz | - Megahertz |
| ms | - millisecond |
| mV | - millivolt |
| µV | - microvolt |
| No. | - Number |
| PWR | - Power |
| RCVR | - Receiver |
| RF | - Radio Frequency |
| RMS | - Root Mean Square |
| RPSTL | - Repair Parts and Special Tools List |
| SIG | - Signal |
| SINAD | - Signal plus Noise and Distortion |
| SSB | - Single Sideband |
| TRANS | - Transmitter |
| UUT | - Unit Under Test |
| V | - Volts |
| Vp-p | - Volts Peak-to-Peak |
| VAC | - Volts Alternating Current |
| VDC | - Volts Direct Current |
| VOL | - Volume |
| VRMS | - Volts Root Mean Square |
| W | - Watts |

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

**SOMETHING WRONG WITH THIS PUBLICATION?**

FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)
Commander
Stateside Army Depot
ATTN: AMSTA-US
Stateside, N.J. 07703

DATE SENT
10 July 1975

| PUBLICATION NUMBER | PUBLICATION DATE | PUBLICATION TITLE |
|---|---|---|
| TM 11-5840-340-12 | 23 Jan 74 | Radar Set AN/PRC-76 |

BE EXACT PIN-POINT WHERE IT IS

| PAGE NO | PARA-GRAPH | FIGURE NO | TABLE NO |
|---|---|---|---|
| 2-25 | 2-28 | | |
| 3-10 | 3-3 | | 3-1 |
| 5-6 | 5-8 | | |
| | | F03 | |

**IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:**

Recommend that the installation antenna alignment procedure be changed throughout to specify a 2° IFF antenna lag rather than 1°.

REASON: Experience has shown that with only a 1° lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2° without degradation of operation.

Item 5, Function column. Change "2 db" to "3db."

REASON: The adjustment procedure for the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.

Add new step f.1 to read, "Replace cover plate removed in step e.1, above."

REASON: To replace the cover plate.

Zone C 3. On J1-2, change "+24 VDC to "+5 VDC."

REASON: This is the output line of the 5 VDC power supply. +24 VDC is the input voltage.

SAMPLE

PRINTED NAME, GRADE OR TITLE AND TELEPHONE NUMBER
SSG I. M. DeSpiritof 999-1776

SIGN HERE
SSG I. M. DeSpiritof

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS

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DOD 314

SAMPLE

Commander
US Army Communications-Electronics Command
and Fort Monmouth
ATTN: DRSEL-ME-MP
Fort Monmouth, New Jersey 07703

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FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS

DATE SENT

| PUBLICATION NUMBER | PUBLICATION DATE | PUBLICATION TITLE |
|---|---|---|
| TM 11-6625-3016-20-1 | 20 June 1983 | Radio Test Set AN/GRM-114A |

BE EXACT PIN-POINT WHERE IT IS

| PAGE NO. | PARAGRAPH | FIGURE NO. | TABLE NO. |
|---|---|---|---|
| | | | |

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

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|---|---|---|
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BE EXACT PIN-POINT WHERE IT IS

| PAGE NO. | PARA-GRAPH | FIGURE NO. | TABLE NO. |
|---|---|---|---|
| | | | |

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER

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RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

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**SOMETHING WRONG** WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS

DATE SENT

| PUBLICATION NUMBER | PUBLICATION DATE | PUBLICATION TITLE |
|---|---|---|
| TM 11-6625-3016-20-1 | 20 June 1983 | Radio Test Set AN/GRM-114A |

BE EXACT PIN-POINT WHERE IT IS

| PAGE NO. | PARA-GRAPH | FIGURE NO. | TABLE NO. |
|---|---|---|---|
| | | | |

IN THIS SPACE TELL WHAT IS WRONG
AND WHAT SHOULD BE DONE ABOUT IT:

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER

SIGN HERE

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPE OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

TEAR ALONG PERFORATED LINE

REVERSE OF DA FORM 2028-2

FILL IN YOUR UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

Commander
US Army Communications-Electronics Command
and Fort Monmouth
ATTN: DRSEL-ME-MP
Fort Monmouth, New Jersey 07703

TEAR ALONG PERFORATED LINE

By Order of the Secretary of the Army:

JOHN A. WICKHAM JR.
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